AUTOMOTIVE INDUSTRIES
THE AUTOMOBILE

Reg. U. S. Pat. Off.
Established 1902

Vol. 62 No. 25

NORMAN G. SHIDLE, Directing Editor

LESLIE PEAT, Managing Editor
P. M. HELDT, Engineering Editor
JOSEPH GESCHELIN, Asso. Eng. Editor
ATHEL F. DENHAM, Field Editor
HAROLD E. HILLMANN, Asst. Editor
HERBERT HOSKING, News Editor
HAROLD M. BAKER, Detroit News Rep.
A. B. CROFOOT, N. Y. News Rep.

Contents

Aggressive Export Program to Follow Passage of Tariff. By Leslie Peat 931
Byrd's Polar Flights Are Immortalized 933
Better Quality With Speedier Output Is Keynote at Pierce-Arrow Paint Shop. By Joseph Geschelin and Leroy F. Maurer 934
Gas-Turbo-Supercharger Shown to Be Possible as Economical Prime Mover. By Edmund B. Neil 942
Instalment Sales Losses Lower Than Open Credit. By L. W. Moffett 939
Just Among Ourselves 941
Mechanical Properties of Aluminum Alloys for Castings Improved by Heat. By T. W. Downes 944
Lycoming Enters Marine Field With 40 Hp. Engine 950
New Developments 952
Permanent Mold Cast-Iron Brake Drum Developed by Holley 956
by Holley 956
Automotive Oddities 958
News of the Industry 959
Men of the Industry 962
Calendar of Events 966
Advertisers' Index 106, 107

Automotive Industries is published every Saturday by

CHILTON CLASS JOURNAL COMPANY

Chestnut and 56th Streets, Philadelphia, Pa.

C. A. MUSSELMAN, President and General Manager
J. S. HILDRETH, Vice-Pres. and Director of Sales
W. I. RALPH, Vice-Pres. G. C. BUZBY, Vice-Pres.
A. H. VAUX, Secretary and Treasurer
JOHN A. CLEMENTS, Asst. Treasurer

JULIAN CHASE, Business Manager Automotive Industries
GEO. D. ROBERTS Advertising Manager

Cable Address ..... Autoland, Philadelphia
Telephone ..... Sherwood 1424

OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 0080
Chicago—5 South Wabash Ave., Phone Central 7045
Detroit—710 Stephenson Bldg., Phone Northway 2090
Cleveland—1140 Guardian Bldg., Phone Main 6860
Los Angeles—433 Petroleum Securities Bldg., Phone Westmore 9084

Controlled by United Business Publishers, Inc., 239 West 39th St., New York; ANDREW C. PEARSON, Chairman, Board of Directors; Fritz J. Frank, President; C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

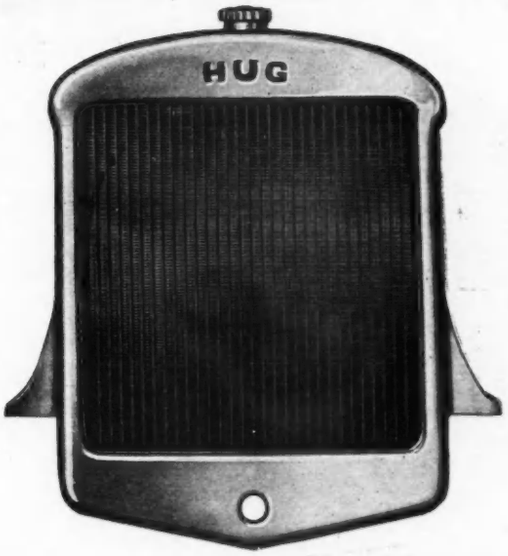
SUBSCRIPTION RATES: United States, Mexico, United States Possessions, Canada and all countries in Postal Union, $3.00 per year; Foreign, $6.00 per year. Single Copies 35c.

COPYRIGHT, 1930, CHILTON CLASS JOURNAL COMPANY

Member of the Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Automotive Industries—The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

HUG Roadbuilders



THE HUG CO., Highland, Ill., whose trucks go into hard, rough, steady service, must have dependable, trouble-free cooling.

C. J. Hug, the builder of the well known HUG Trucks has had many years of experience in the manufacture of roadbuilding trucks and has long ago chosen Young Radiators for all models.

Young Radiators, noted for correct design and sturdy construction beyond the common meaning of the term, can be depended upon for perfect performance *all the time*, under the most severe conditions of service. That's why you find Young Radiators on products of the leading power-machinery builders.

Fine quality radiators for busses, trucks, tractors, power units, and all types of cooling installations backed by a guarantee of satisfaction.

Young Radiators

YOUNG RADIATOR COMPANY

Racine, Wisconsin

Young Quality

Pacific Coast Representative

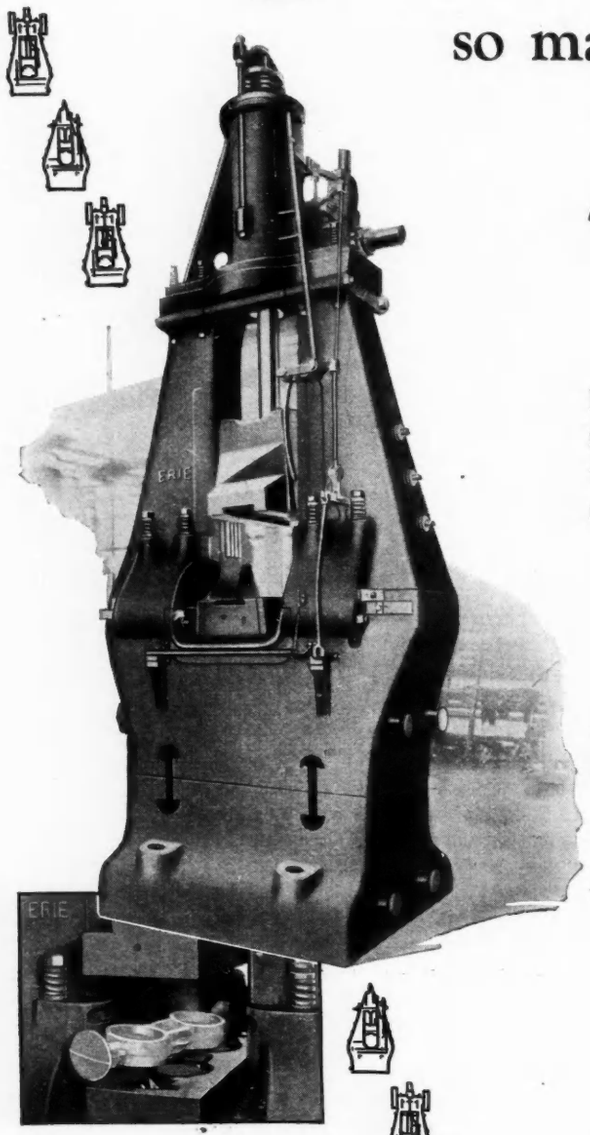
S. CLYDE KYLE

Rialto Building :: San Francisco

Reg. U. S. Pat. Off. ©Y. R. Co.

YOUNG RADIATORS ARE USED WHERE THE GOING IS TOUGH

Do you know why so many *automotive leaders* use ERIE Hammers?



The forged piece gets the full weight of the ram on every blow. No loss of 20% to 25% due to guide friction. The ERIE'S oversize guides, with positive adjustments, maintain an accurate fit.

THE practical forger does not buy a hammer simply because some other users prefer it—

He buys solely on the hammer's own merits.

But, after you have made careful comparisons and have decided on an ERIE Hammer, it's a big satisfaction to know that your judgment is backed by the forging superintendents of such prominent automotive manufacturers as:

Chrysler, Studebaker, Ford, Packard, Nash, Willys-Overland, Timken, Continental, Kelsey Wheel, Spicer—and others in this same class.

These manufacturers, and leaders in other industries, must have the hammer that gives *biggest production* and *lowest-cost forgings.*

ERIE Hammers are the choice of leaders because of higher efficiency—

that results in production of forgings with fewer blows, in less time.

And the sturdier construction of ERIE Hammers insures better dependability, and lower operating cost.

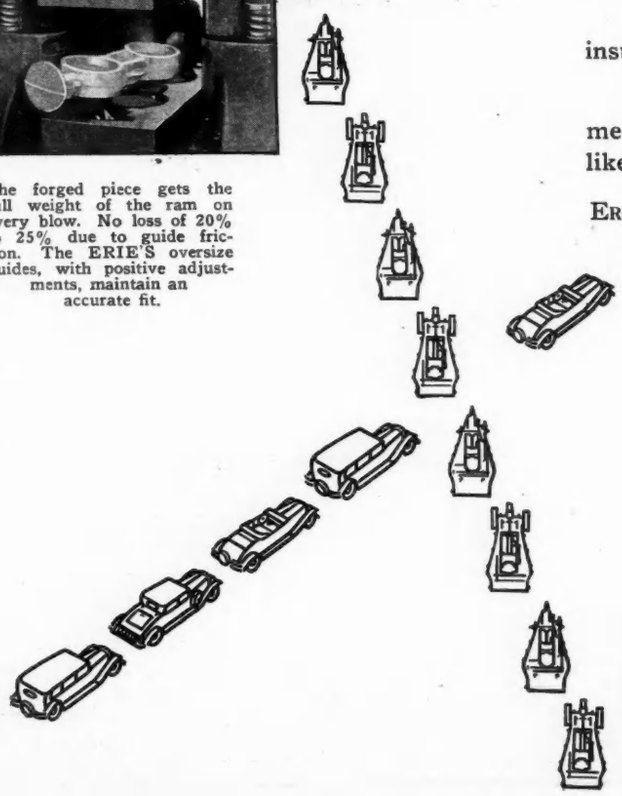
The more carefully you make comparisons of hammers and production records, before buying, the more likely you are to select an ERIE.

ERIE FOUNDRY engineers will be glad to furnish data on the improvements in production you can reasonably expect with ERIES.

ERIE FOUNDRY COMPANY
Erie, Pa.

STEAM DROP HAMMERS—BOARD DROP HAMMERS
SINGLE AND DOUBLE FRAME FORGING HAMMERS
TRIMMING PRESSES—TOOL DRESSING HAMMERS

Indianapolis: 335 Postal Station Bldg.
Chicago: 549 Washington Blvd. Detroit: 335 Curtis Bldg.
Paris, France: 8 Rue de Rocroy
Birmingham, England: 174 Edmund Street



ERIE

181

AUTOMOTIVE INDUSTRIES

VOLUME 62 JUNE 21, 1930 NUMBER 25

Aggressive Export Program to Follow Passage of Tariff

Enactment of act has cleared the air

Manufacturers face foreign merchandising problems with renewed vigor

By Leslie Peat

BECAUSE the new tariff schedule, enacted by Congress last Saturday and signed on June 17 by President Hoover, seems likely to add to the foreign sales resistance which was caused by the business slump and general industrial recession throughout the world last fall, the automobile industry is laying plans to merchandise cars and trucks abroad more aggressively than ever.

Leaders of the industry spoke their minds about the tariff while the present schedule was in the House, the Senate and the Committee. They pointed out some of the fallacies which, they believe, lie in too high protection for a creditor nation. They spoke of international opposition to American-made products. They decried the possible wholesale destruction of the goodwill of the world.

But now that Congress has legislated the new tariff, factories generally have concluded that the next step is to keep exports on as high a level as possible.

The tariff question is one to which there always has been two sides among the business men of the world in general, as well as among American executives in particular.

Despite the strong feelings of a majority of automotive men about the American tariff just passed, it is worth remembering that accurate forecasting of the effects on prosperity of a particular tariff always has been a hazardous task.

President Hoover, in signing the present bill, indicates a strong confidence in the potency of the flexible provision and of the Tariff Commission machinery to remedy inequalities in the rates fixed by Congress. He points out that "no tariff bill ever has been enacted or ever will be enacted under the present system that will be perfect."

If the President is correct in his belief, adverse effects on automotive export trade may turn out to be much less than are feared by many automotive execu-

tives. Naturally everybody is hoping that this will be the case, now that the new tariff has been signed.

The industry as a whole had expected to make a good showing for 1930, largely upon the supposition that exports were going to be near the 1,000,000 vehicle mark this year. Curtailment of 30 per cent or more seems altogether likely. First-half exports, Canadian production and foreign assemblies will reach about 420,000 cars and trucks, as compared with approximately 624,000 for the first six months of 1929.

Developments in View

Two developments in foreign automobile trade which in all probability will occur are: *first*, development of more intensive foreign assembly programs, and *second*, reduction to a further degree of such car accessories and equipment as are not absolutely necessary to transportation, thus lowering the delivery price as much as possible.

American ingenuity has made mass production an accepted practice in this country and Canada. American methods have been tried successfully in Europe. The American industry has paid for experiments in every phase of the manufacture, merchandising and financing of automobiles. European assembly plants of American companies will profit by these experiments, and the consumer abroad will benefit by them in the same proportion.

Any development of foreign assembly program means, in the long run, that more and more foreign materials and foreign-made parts will be used in automobiles and trucks manufactured overseas. This encouragement of foreign steel mills and parts plants will further add to the foreign buying power and will in turn result in increased vehicle production.

Quite a few companies have pared accessories from cars for export, and have reduced the number of equipment items to a large extent, thus bringing the list prices nearer the lower purchasing power now prevailing abroad (caused by the pyramiding of tariffs and taxes). A $20.00 reduction in the U. S. list means about $32.00 less in our largest foreign markets.

Since the European acceptance of automobiles as a commodity is approximately 10 years behind ours, accessory sales abroad are still a large item to those who buy cars. An American car fitted with European accessories meets less sales resistance, since its delivery price is lower.

The passage of the present tariff has cleared the air. While it was in its various legislative stages, car manufacturers were unable to chart their export programs. Now, knowing the danger of retaliatory measures, and realizing that international goodwill may have suffered, they can proceed to lay plans which will, in a large measure, offset the new problems in the export field. It would seem likely that the foreign trade agencies interested in automobile exports will increase their operating appropriations and in typically American style redouble their efforts to retrieve the business which has, to some extent, retrograded this year.

Industry Has Advantage

As a matter of fact, the automobile industry has a large advantage because of the degree of goodwill which has been created by American manufacturers abroad. Many Europeans understand the manner in which our legislative bodies work, and some will probably see the situation in a charitable light.

Industrial leaders generally are realizing that interdependence of industrial interests is world wide. The development of manufacturing facilities abroad means eventual interlocking of managements, teaming-up of capital and a unified activity in exploiting the natural resources, the man power and the ingenuity of nations which heretofore have been competitive.

Financial institutions, public utilities, shipping and manufacturing interests have proved that this larger internationalism pays. The automobile industry, like many others, began to export through native importers, supplying service assistance and sales helps which were adapted to overseas conditions. The same attitude was taken by assembly and manufacturing enterprises. The result is that goodwill between buyer and seller has accrued in large measure.

The presumption that expansion of the automobile business here and abroad will continue is based upon the theory that the standard of living, barring some great cataclysm, will continue to rise generally throughout the world. Once automobile transportation has been known, it is hard to conceive of civilization returning to the ox cart.

The use of automobiles produces wealth. More work can be done in less time and more distribution problems can be solved with trucks and cars. As a result, the motor vehicle—the American designed vehicle in particular—is becoming more and more an integral part of the life and experience of the peoples of the world. And they will not forsake that which makes earning, the acquisition of profit and personal comfort so much easier than the old methods.

It is upon the lessons of the past, upon the goodwill which has been made, upon the universal urge to do things more efficiently, that the industry faces the future in exports with confidence. Business can and will be had by business methods. Despite legislative handicaps here and abroad, the automotive industry has seen its problem and has begun to solve it.

"I believe that the flexible provisions can within reasonable time remedy inequalities.

"That the bill gives protection to agriculture for the market of its products and to several industries in need of such protection for the wage of their labor and that with returning normal conditions our foreign trade will continue to expand."

—President Hoover.

Byrd's Polar Flights are Immortalized

Photo Courtesy Philadelphia Evening Bulletin
By Special Arrangement with the New York Times

With a stone from the Arlington grave of Floyd Bennett, his pilot on the Arctic expedition, Rear Admiral Richard E. Byrd weighted the American flag which, hurled from an airplane, marked the discovery of the South Pole by air, on Nov. 28-29, 1929

WITH a dinner on June 25, in honor of Rear Admiral Richard Evelyn Byrd, the Aeronautical Chamber of Commerce of America will set off a long train of such events to celebrate the achievement of conquering the South Pole by air. Notables of the aviation industry and from all walks of life who are present at the dinner will be presented with bronze replicas of the medallion shown above. One gold example will be struck and presented to Admiral Byrd.

The South Pole was crossed and recrossed by Admiral Byrd, his navigator and radio operator, on Nov. 28-29, 1929. The transportation medium was a Ford tri-engined airplane, with radial air-cooled engines.

In reviewing his North Polar flight, Admiral Byrd pays high tribute to the performance of these engines under difficult operating conditions. Writing in the *New York Times* he says: "The perfection of the air-cooled motor is largely responsible for the result."

Again, he says: "But aside from this contingency (the hazard of landing a plane on the broken Arctic ice) . . . the fight was merely a matter of proper preparation, reliable engines and navigation."

Besides the spectacular feat of making the actual South Polar crossing, the airplanes with the Antarctic expedition performed useful and difficult services for the scientific members of the Byrd party.

"The Floyd Bennett (the Ford plane) put down useful fuel and food supplies last November for Gould's geological party 400 miles from Little America," Admiral Byrd wrote from Panama. "This, it seems to me, was a triumph for aviation, and for Smith and June, who made the landing."

Regarding the possible future of aerial exploration in the Antarctic, the Admiral says:

"I believe that most of the flying in the Antarctic, certainly the long-distance flights, should be done by two ships together, so if one is forced down the other can give assistance and, if possible, carry home the crew of the disabled plane. They could start across the continent in any direction and at intervals lay down bases of fuel oil and food several hundred miles apart. This base-laying business is not without hazard and must be carefully planned.

"Such planes could and should be powerful enough and with sufficient lift to land and get off the snow at the altitude of the Polar Plateau—which is merely a question of engine power and design."

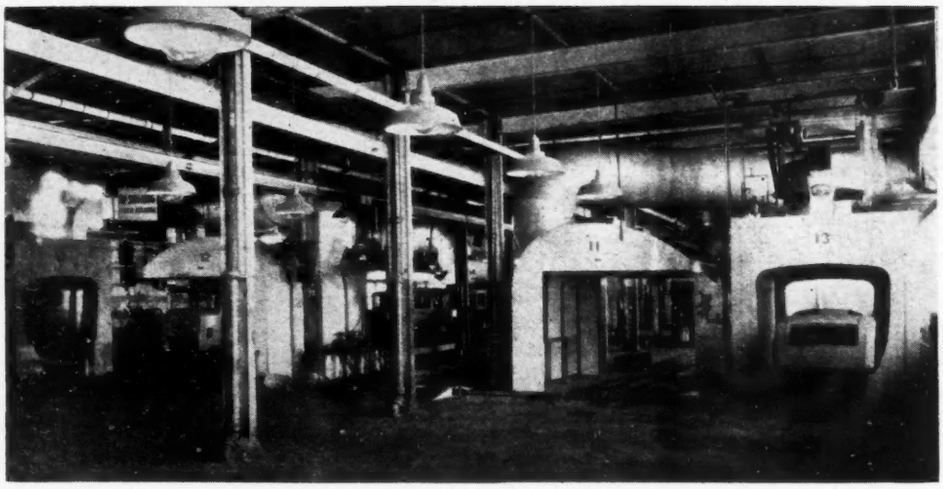


Fig. 5 — Second and third lacquer coat spray booths and dryers for third lacquer coat - - - - -

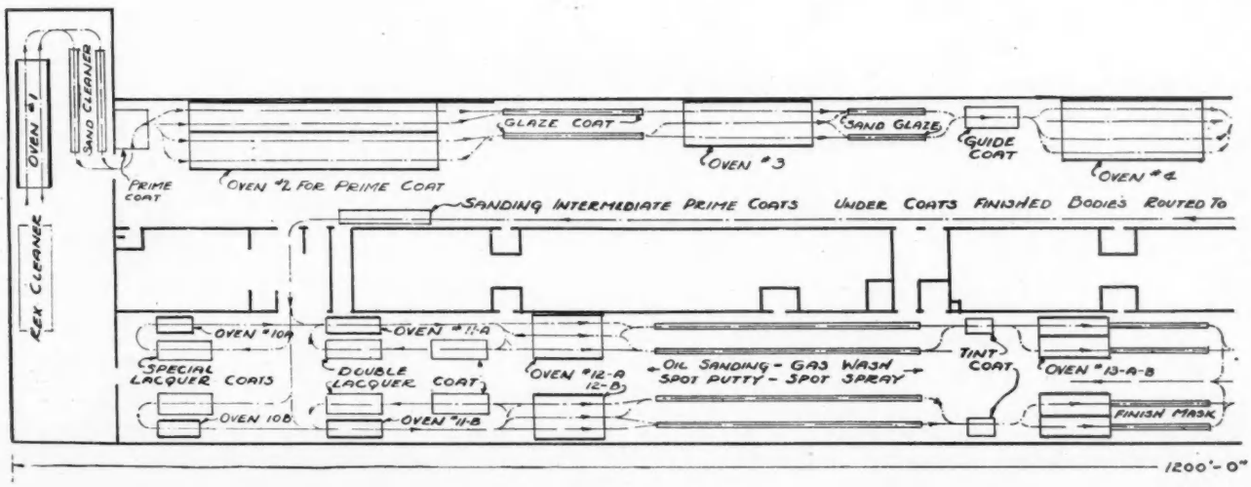
Better Quality With Speedier Output

Smoothness of operation and high standard of finish hinge upon performance of Dry-Sys ovens, especially designed and built for the company - - - - - -

A DRAMATIC shift from slow, time-honored methods of fine coach finishing to modern processes in which highly specialized methods are coupled with scientifically designed equipment, features the new paint shop at the Pierce-Arrow plant. With an output of 12 bodies per hour, in a decidedly smaller space, the finished job is turned out faster, with less labor and with what is of first consideration to Pierce-Arrow, positive assurance of maintaining their traditional high standard of quality. Yet, the new plant possesses the flexibility to handle 17 optional colors in combinations of three, and has a special short line taking care of additional color combinations, optional on de luxe jobs.

The magnitude of the paint shop layout with its 17 separate ovens and the other supplementary working stations may be visualized from the composite floor plan shown in Fig. 1. A detail of the operations along the line, together with a description of the drying ovens, will be given later. All bodies, regardless of type and color specifications, follow the same routing

Fig. 1 — Composite floor plan of entire paint shop



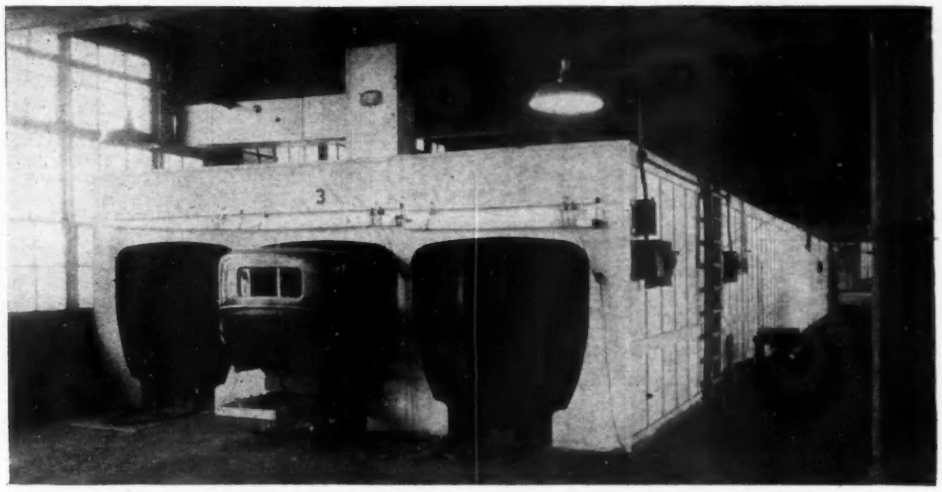


Fig. 6—Entering end of dry room with the three curtains raised and body traveling down center line - -

is Keynote at Pierce-Arrow Paint Shop

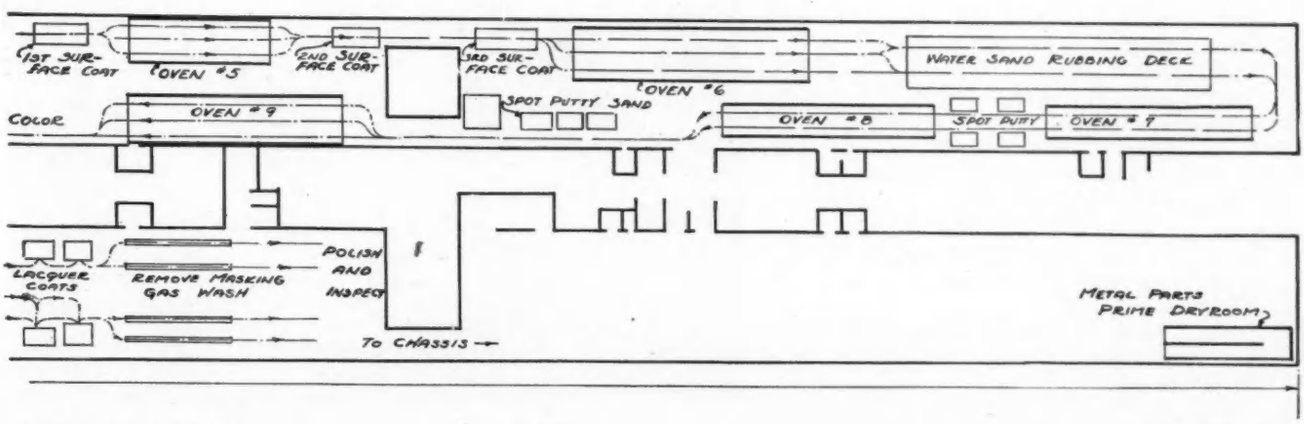
By Leroy F. Maurer
Works Manager,
Pierce-Arrow Motor Car Co.
and
Joseph Geschelin

for the undercoat operations. They are then delivered to the scheduling stores department, whence they are sent to the color line, in accordance with special instructions.

Needless to say, the operation of the paint shop, as well as the final quality of the body finish, hinge upon the performance of the drying ovens, which were designed and built by Drying Systems, Inc., Chicago, Ill. Extensive research by paint technologists has shown conclusively that good body finish is entirely dependent upon the maintenance of proper conditions within the dry-rooms. In fact, now it is well known that both the finish and endurance of undercoats and lacquer are dependent upon heat control. The first essential is an accurate control of the time required to bring the entire metal surface up to the peak temperature; then the maintenance of the peak temperature for a definite period of time, and finally a definite cooling rate from the peak temperature to room temperature.

The heating-up period of the cycle is of the utmost importance. In fact, it is one of the determining factors of the quality of the coatings, as it has been found desirable to have the entire metal surface brought up to the oven peak temperature at a definitely fixed time in order to properly evaporate the solvents.

The cooling part of the cycle is also of great importance, as the cooling down of the body affects the hardness of the coating and limits the time between applications. A unique feature of the Dry-Sys oven is that it provides a uniform atmosphere from top to bottom, an essential part of Pierce-Arrow specifications being that temperature measurements at the bottom, center and top shall agree within 5 deg. Fahr. plus or



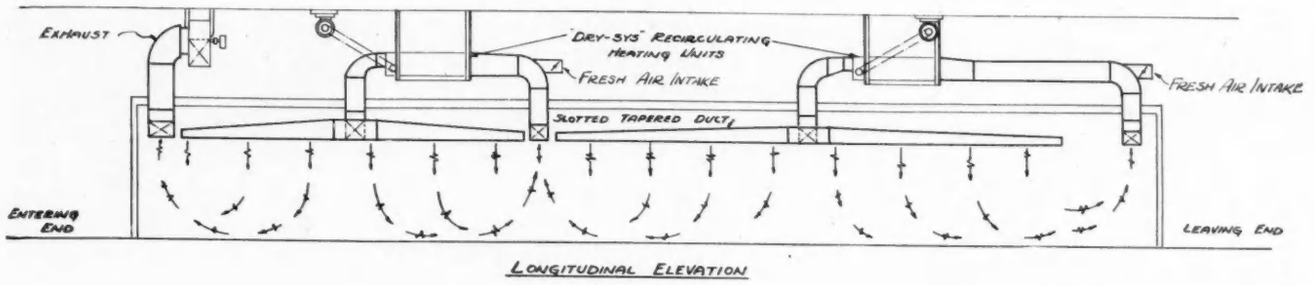


Fig. 2—Diagrammatic sketch of "Dry - Sys" circulating system - - - - - -

Operations in Pierce-Arrow Paint Plant

1. Metal Cleaner
2. Dry Metal Cleaner
3. Sand Cleaner
4. Primer Spray
5. Dry Priming Coat
6. Glaze Coat
7. Dry Glaze Coat
8. Sand Glaze
9. Spray Guide Coat
10. Dry Guide Coat
11. Spray First Surface Coat
12. Dry First Surfacer
13. Spray Second Surfacer
14. Air Dry Second Surfacer
15. Spray Third Surfacer
16. Dry Surface Coats
17. Water Sand Deck
18. Dry-Off after Water Sand
19. Spot Putty
20. Dry Spot Putty
21. Spot Putty Sand
22. Spray Intermediate Prime Coat
23. Dry Intermediate Prime Coat
24. Sand Intermediate Prime Coat
25. To schedule and delivery conveyor
(a) Special spray booth for special jobs
(b) Dry special jobs
26. Spray First double lacquer coat
27. Dry First double lacquer coat
28. Spray Second double lacquer coat
29. Dry Second double lacquer coat
30. Slush and scuff
31. Spray final lacquer coat
32. Dry final lacquer coat
33. Oil Sand
34. Gas Wash
35. Spot Putty
36. Spot Spray
37. Spray double tint coat
38. Dry double tint coat
39. Finish Masks
40. Spray First and Second color lacquer coats on belts and reveals
41. Air Dry
42. Spray Third and Fourth color lacquer coats on belts and reveals
43. Air Dry
44. Remove Masking and Gas Wash
45. Final Inspection
46. Hand rub and polish

minus of the basic peak temperature. The importance of this cannot be overestimated, since the character of the finish is dependent upon temperature control. For example, if the temperature at the bottom of the oven tends to be lower than at the top, the lower part of the body may not be thoroughly baked, or the upper part of the body may have to over-dry to dry the lower part sufficiently.

The heat flow diagram (Fig. 2) shows the principle of operation of the Dry-Sys oven. This is a typical arrangement embodying two units which supply a large volume of heated air to a system of ducts. These ducts run along the walls of the oven near the top and force air down toward the floor, establishing convection currents from bottom to top. As indicated by the directional arrows in the diagrams, a definite part of the circulating atmosphere is picked up by the return ducts, drawn through the heating unit and recirculated. The remaining portion of the atmosphere is picked up by the exhaust duct and discharged. Required additions of fresh air enter through the fresh air inlet, pass through the heating unit, and then mix with the oven atmosphere. It is evident that the size and arrangement of the supply ducts along the wall of the oven as

Fig. 7—Schedule storage department with side-engagement conveyor at the right

well as variations in air flow may be readily adjusted to secure hot zones of varying intensities and lengths. Accurate temperature control is assured by the use of thermostats acting through diaphragm valves, controlling steam flow to the heaters.

Although the essential function of the cycle described here is to provide heat zones of definite lengths and intensities, it also provides an added degree of economy by virtue of the system of recirculation described above. Since a large portion of the atmosphere is recirculated, it is obvious that a smaller quantity of heat is required to maintain uniformity. Then, too, this method provides heat zones which are less sensitive to temperature changes because of the small time interval required to heat the exhausted mixture from its return temperature to the delivery temperature.

The flexibility provided by this circulating system has enabled Pierce-Arrow to install ovens having heating characteristics especially adapted to each individual operation. This is exemplified in the following heat curves, one of which covers a heating cycle of 2½ hr., the other 1½ hr. Fig. 3 is a time temperature curve for dry room No. 6, where the heating cycle is 2½ hr. The first part of the curve covers the initial heating from approximately room temperature to the peak temperature of 185 deg. The body is held at the peak temperature of 185 deg. Fahr. for 60 min. and then cooled for about 30 min. from the peak temperature down to about 95 deg. Fahr. Fig. 4 depicts the conditions in dry room No. 12, when an entirely different heating requirement is met. Here the peak temperature is 145 deg. Fahr., maintained for about 45 min. The initial heating takes 30 min., while cooling takes only 15 min.

Figs. 5 and 6 show two of the ovens, one being single-track, the other three-track. Several of the other ovens are four-track. Fig. 6 shows clearly some of the important elements of a typical oven installation. Part of the circulating system with the exhaust duct leading to the outside is shown at the top. At the right is the driving mechanism for the timing conveyor which engages the truck on which the body is mounted. Further down on the same wall are located the recording instruments with which every oven is equipped. The charts are checked and changed every 24 hours, giving the paint technologist an accurate picture of the performance of every oven. Incidentally, it is the practice here to get a three-point reading of temperature with every run. For this purpose readings are taken by means of thermometers located at the top, center and bottom of the body. As noted earlier, these readings must not vary more than 5 deg. Fahr., plus or minus, from the peak temperature.

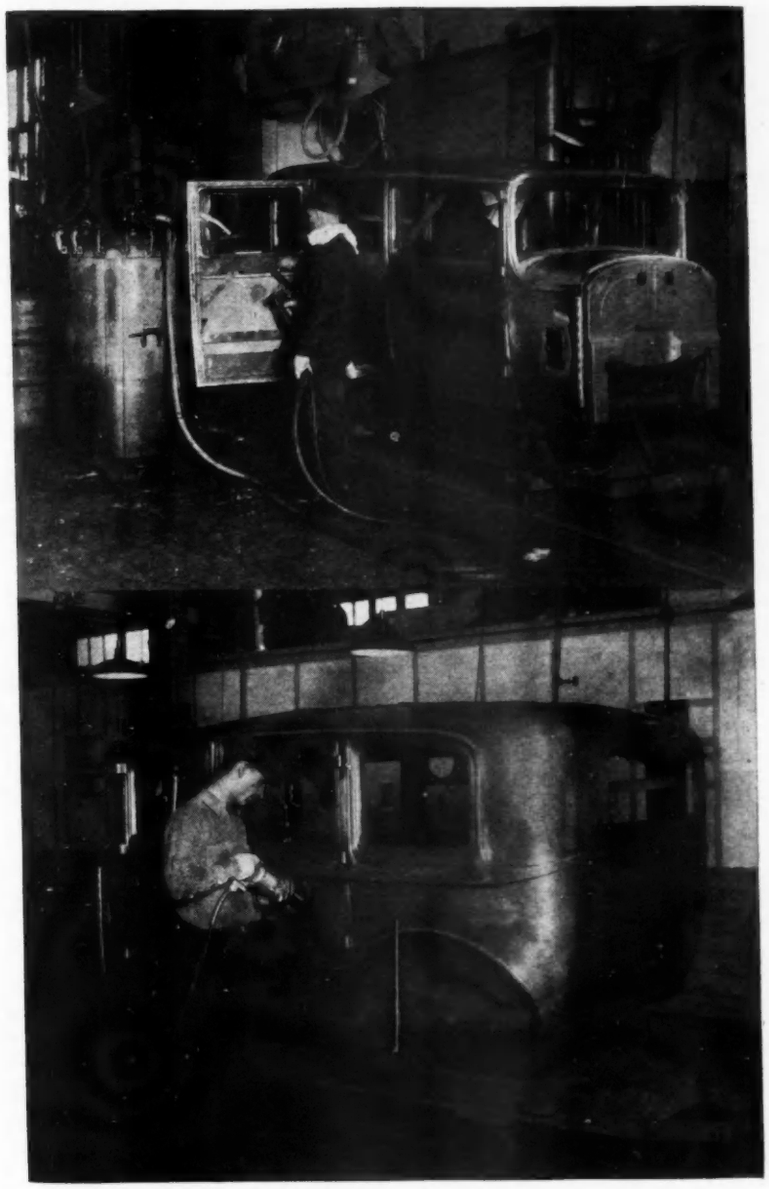


Fig. 8 — Applying plastic coating which serves as protective coating and deadener

Fig. 9—Scratch-brushing to remove cleaner

Fig. 5 shows a pair of lacquer spray booths and ovens. Except for size and arrangement, the general features of these ovens are the same as those of the larger installations.

An interesting feature recently introduced is a safety catch mounted on the side of the oven which is tripped if a body door is ajar. This safety device is electrically connected to the conveyor driving mechanism and stops the conveyor in time to prevent damage to the door.

With this brief discussion of the main elements of the drying equipment we can profitably make a short excursion through the paint shop by following the

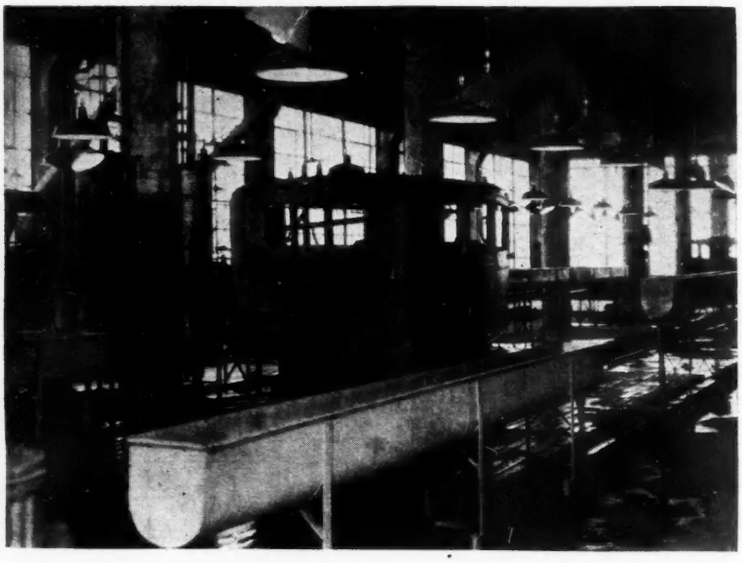


Fig. 10—Modern water sand deck with conveniently located water tanks. Ample illumination afforded by closely grouped lamps with special reflectors - - -

composite floor plan which was laid out for the purpose. This floor plan comprises 17 ovens distributed through the paint department which has been spread over the fourth floor of the connected buildings G, H and I. Estimated peak production in the paint shop is 12 bodies per hour. The progress of operations extending over 46 different stations has been charted in detail below. The first 25 operations cover the undercoating process to which all bodies are routed, while succeeding operations are all concerned with color and include variations depending upon the customer's specifications.

One of the most interesting developments in this paint plant is the installation of what might be called a body schedule storage department, a view of which is shown in Fig. 7. At the end of the 25th operation the undercoat job is complete and the body is shunted directly to this department, awaiting the special paint schedule from the planning department. As the schedule comes through, the proper type is picked out, shunted to the track at the right, where it engages the side drag conveyor and is automatically conveyed to the color line. Note the compactness of this conveyor and the arrangement of the return chain.

As mentioned before, 17 different colors in combinations of three are standard and specified by the purchaser, augmented by a wide range of special colors on de luxe models. To provide the necessary flexibility, demanded by the optional colors, ovens 10A and 10B have been set apart from the regular line and will accommodate special color jobs which can circle back and forth in that small department until completed.

The first operation preceding the paint shop operations is that of spraying a plastic deadener coating on the inside panels, as shown in Fig. 8, the object being to provide both a protective coating for the inside panel and a deadener to prevent drumming or sound box effects within the body. Fig. 9 shows the scratch-brushing operation after the metal cleaner has been removed, the function of this operation being to remove all traces of cleaner from inaccessible spots and corners that are not reached in the preceding operation.

(*Continued on page 951*)

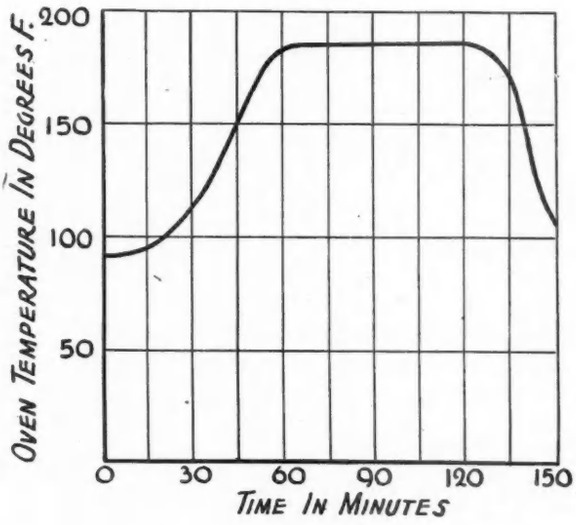


Fig. 3—Cycle of heat control operations in drying second and third surfacer coats (upper right)

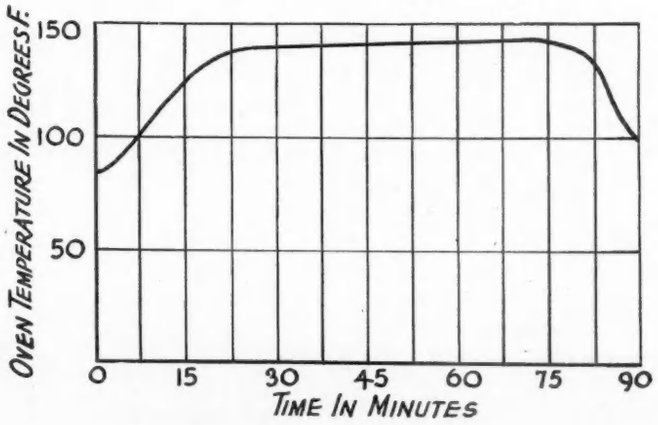


Fig. 4—Heat control chart, showing cycle of operations in dryroom for second lacquer coat (right)

Instalment Sales Losses Lower Than Open Credit

Smaller automobile dealer organizations have higher average loss than the larger, Department of Commerce indicates in survey of national conditions

By L. W. Moffett

Down payment of 25 per cent, with six months to take title, was the average terms in 1927 for partial payment plan in buying automobiles

AVERAGE losses on open credit sales of 569 automobile dealers in 1927 were 1 per cent and on instalment sales only 0.3 per cent, it was disclosed in the recent nation-wide credit study conducted by the Department of Commerce. This study, undertaken at the request of the National Retail Credit Association in which more than 1000 credit bureaus and 25,000 merchants cooperated, sets forth without recommendation the experience in credit extension of a large number of establishments in all sections of the country. It includes reports from 569 automobile dealers and 678 automobile accessory stores.

The report says there was a very definite relationship between instalment credit losses and the size of establishments. The larger automobile dealers had lower credit losses than the smaller ones. The two extremes were the establishments in the smallest group, those with sales less than $50,000, which had an average loss on instalment sales of 1.2 per cent, and the establishments in the largest group, those with sales of $1,000,000 and over, which had an average loss on instalment sales of only 0.1 per cent, just one-twelfth as much.

Frequency tables incorporated in the report show that individual dealers varied greatly among themselves with regard to credit losses. There were 341 dealers with the very low loss on instalment sales of less than 0.2 per cent, but there were 102 with 1 per cent or over and 19 of those had the exceedingly high loss of 5 per cent or over.

The same variation was found with regard to open credit losses. There were 105 dealers with the low loss on open credit sales of less than 0.2 per cent and 88 with the high loss of 5 per cent or over. The dealers in the latter group thus had losses 25 times as great as the former.

Net sales of the 569 dealers in 1927 totaled $261,137,556 and the reports indicate that 37.1 per cent of this amount was for cash, 16 per cent on open credit and 46.9 per cent on instalment credit. The figures lack definite significance as to the proportion of cars sold on instalments, since sales include accessories and service as well as automobiles. On the basis of 198 establishments reporting for 1925, 1926 and 1927, it was found that cash sales decreased 0.9 per cent during this period and instalment sales increased 22.1 per cent. The report points out that there is no way of knowing how accurately this sample of 198 dealers with net sales of $98,129,000 represents the relative increase or decrease of cash and credit sales for the period studied.

Of 569 dealers reporting on the down payment required, 523, or 91.9 per cent of the total, reported that they required at least 33 1/3 per cent down payment. There were 443 dealers, or 77.9 per cent, which limited the life of the instalment contracts to 12 months as opposed to 126, or 22.1 per cent, which used standard terms in this respect. The average repossession ratio (gross loss) of 226 dealers was 3.3 per cent of gross instalment sales. The percentage of returns and allowances on cash, open credit, and instalment sales, respectively, were 3.9 per cent of gross cash sales, 4 per cent of gross open credit sales, and 4.2 per cent of gross instalment credit sales. The open account collection ratio percentage for the whole country was 48.1 per cent a month. Dealers having sales of $50,000 to $99,999 (nine reporting) had the lowest average, which

was 30.8 per cent. Dealers having sales of $1,000,000 or over (10 reporting) had the highest average, which was 61.4 per cent. April, with 53.4 per cent, had the highest average of any month, and January, with 43.9 per cent, had the lowest average. The instalment account collection percentage for the whole country was 17 per cent a month. Dealers having sales of $250,000 to $499,999 (40 reporting) had the lowest average, which was 14.8 per cent. Dealers having sales of $50,000 to $99,999 (six reporting) had the highest average, which was 24.6 per cent. March, with 19.1 per cent, had the highest average of any month, and November, with 15.7 per cent, had the lowest average.

Accessories Sold for Cash

The 678 reporting automobile accessory stores had total net sales in 1927 of $56,987,725 and returns from them indicate that 53.8 per cent of this amount was for cash, 44.5 per cent on open credit and 1.7 per cent on instalment credit. Of the total reporting, 164 sold for cash only, 432 sold for cash and open credit only, two sold for cash and instalment credit only and 80 sold for cash, open credit and instalment credit. On the basis of returns from 265 stores reporting for 1925, 1926 and 1927, it was found that cash sales increased 11 per cent in 1927 over 1925, open credit sales increased 7.7 per cent and instalment sales increased 30.1 per cent. Despite the fact that instalment sales increased greatly during the period, such sales constituted a small proportion of total sales. Credit ranged from 44.4 per cent for the smallest stores, those with sales under $25,000, to 69.8 per cent for the largest stores, those with sales of $250,000 and over.

Smaller Store—Larger Loss

There was no difference on the whole, in the proportion of instalment business done by the small and large stores. The great difference was in open credit sales. The range of open credit sales was from 41.8 per cent of total sales for the smallest stores to 67.3 per cent for the largest stores. The average loss on open credit sales was 1.3 per cent. The average loss on instalment credit sales was 3.6 per cent. Open credit losses varied inversely with the size of stores, the larger the stores, the smaller the losses, on the average. The range was from an average open credit loss of 2.8 per cent for the smallest stores to .8 per cent for the largest stores. There were 73 stores with losses on open credit sales less than .2 per cent. At the other extreme were 64 stores with losses on open credit sales of 5 per cent or more. The set of terms found most frequently was a down payment of 25 per cent and the period of time over which the balance was to be paid six months or later. The set of terms taking second place for frequency was a down payment of 30 to 33 1/3 per cent and the life of contract six months or less.

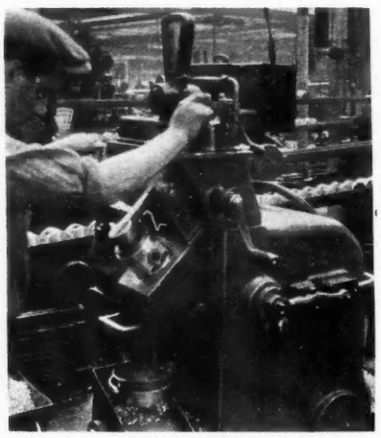
Of the 496 automobile accessory stores doing credit business, 15 of them, or 3 per cent, were chain stores and 481 or 97 per cent were not. The average open credit loss of the chain stores was 1.6 per cent and the average instalment credit loss was 4.3 per cent. The average open credit loss of all other than chain stores was 1.3 per cent and the average credit loss was 3.5 per cent.

The percentage of returns and allowances on cash, open credit, and instalment sales, respectively, were 2.7 per cent of gross cash sales, 5.9 per cent of gross open credit sales and 5.1 per cent of gross instalment credit sales. The open account collection ratio for the whole country was 49.8 per cent a month. April, with 53.3 per cent, had the highest average, and February, with 46.7 per cent, had the lowest.

Finishing Pistons at the Ford Plant

PISTONS for the Ford car and truck are being finished automatically within fine limits of weight as the result of the development of a new machine by the Ford Motor Co. Ford aluminum pistons, completely finished except for weight, reach the machine all slightly overweight. They leave it, each weighing within two grams of any other piston.

The operator places a piston upon a delicate scale



Fine limits of weight are attained on pistons at the Ford plant by means of this installation - -

to determine the amount of overweight. On top of the machine is another scale which is in mechanical contact with a so-called "chip cup." The operator sets the machine scale to a reading corresponding with the overweight of the piston. Then the piston is placed in position, the machine started, and metal chips bored from inside the piston drop into the cup. When the weight of the chips equals the overweight of the piston, boring automatically stops.

THE Bureau of Standards has been making comparative tests of the protective value of automobile license tags of plain enamel coatings and coatings of enamel and spar varnish superposed. All products used were for outdoor use, and the spar varnish in each case was by the same manufacturer as the enamel. An accelerated test showed that the addition of spar varnish over black and yellow enamel coating decreased the durability in every one of the nine different products.

JUST AMONG OURSELVES

The Indianapolis Race Visioned by an Expert

WE didn't get over to the Indianapolis race this year, but feel as though we know just as much about it as if we had viewed it personally. Reason is that we read through carefully Paul Dumas' interesting interpretive story of the race which was printed in *Automotive Industries* of June 7 and also had the pleasure of listening to Paul comment on a lot of minor incidents which he observed, but which didn't get into the story. Filtered through the eye and brain of an expert, we have more information about the race than could ever have reached our consciousness through the medium of our own inexpert eyes.

After talking with Paul we asked him if he wouldn't put down on paper one or two of the minor incidents about which he had been telling us. He consented and following is the result:

Front Wheel Tramp Slows Bill Cummings

"IT was noticed during the last 50 miles of the Indianapolis race, Bill Cummings on the No. 6 and only remaining Duesenberg was riding in fifth position. He had more speed than he was using but shock absorber trouble allowed the front wheels to tramp badly.

The Puzzling Signal of Evans in No. 24

"DAVE EVANS on car No. 24, a Miller front-drive job, was running well in a position less than a lap behind Cummings. If you were near the pits you might have noticed Evans' pit manager grab the signaling blackboard and in large letters quickly inscribe 'Get No. 6.' The blackboard was hoisted to position for Dave and his mechanic to see. No. 24 came down the homestretch straightway, the car crew saw the blackboard and pointed to a front wheel. What did they want? That wasn't the 'need a tire' signal the car crew had given.

Lap After Lap—Still The Pit Misunderstood

"THE next time around the pit manager held up a tire and the car crew shook their heads. Similar negative nods were given to other objects hoisted aloft by pit attendants. Evans did not overtake Cummings and the pit manager learned why, when Evans got out of the car and shook the right front wheel as the car was standing in its garage.

Steered on One Wheel For Twenty Circuits

"THE Woodruff key holding the right steering arm to the knuckle had sheared. The wheel could be turned through an angle of approximately 15 degrees; the car had been steered on one wheel only for the last 20 laps.

Only Two Prophets Guessed Average Speed

"AN acquaintance of ours spent most of his idle time prior to the race interrogating those who should know as to the probable speed average of the winning car. Of approximately 24 men questioned six guessed that the race would be won at less than 90 m.p.h., 16 at not more than 95, while the two Duesenberg brothers were of the opinion that De Paolo's record of 101-plus m.p.h. would be slightly exceeded.

Time for the 500 Miles Even Surprised Drivers

"THE winner's speed average was truly a surprise not only to the customers but also to many of the contesting drivers, whose tactics were predicated on a race to be won at not above 95 m.p.h."

Anything You Say Will Be Held Against You—

AUTOMOTIVE advertising men beware!

Harper & Brothers is getting out a "Who's Who in Advertising," which not only will lay your business history before a waiting public, but which will also print your own estimate of your disposition, the color of your hair, the texture of your skin and what have you.

Its avowed purpose is to be "a great aid to salesmanship." The idea apparently is that a frightened space salesman will be able to check up before he calls on you and find out exactly whether it's a 3 or a 10- minute egg he is about to try to crack open, thus enabling him to select his egg-cracking implements accordingly.

One question is: "Disposition —Even, variable—or How Described? If a fellow answers that honestly he probably stands a good chance of losing his job when his boss sees the biography in print; if he plays safe, he might cause a salesman to use just the wrong tools in trying to crack him. It's a tough life.

In any case it will be interesting to read the estimates given of their own dispositions by a number of our advertising friends. Then all their friends can have fun checking and double checking —N. G. S.

Gas Turbo-Supercharger Shown to be

Gas temperatures and velocities of exhaust-gas-driven unit are described by Dr. C. A. Lorenzen at A. S. M. E. Oil and Gas Power Meeting

AUTOMOTIVE engineers and others interested in methods of increasing the specific output of internal combustion engines of various kinds and sizes centered their interest during the opening sessions of the A.S.M.E. Oil & Gas Power Meeting at State College, Pa., on a paper by C. A. Lorenzen of Berlin, Germany, internationally known for his work in the development of the exhaust-gas-driven supercharger, some details of which were published in the July 13, 1929, issue of *Automotive Industries*. Although it had been stated previously that Dr. Lorenzen's paper would present information concerning his supercharger for aircraft engines, the anticipated expose of this development failed to materialize. The paper, however, did outline the problems surrounding gas turbine design as affected by practical considerations and described a turbine to be used as a prime-mover rather than for purposes of supercharging piston type engines.

The Lorenzen turbine for both supercharging (exhaust gas driven) and power generation (as a prime mover) is of the constant pressure type operating at comparatively low pressures as distinguished from the Holzwarth constant-volume or explosion type.

Blade Heat a Problem

"The vital problem in building a gas turbine," Dr. Lorenzen stated, "is to prevent the blades from reaching a red heat, principally at the entering edges. Gas temperatures before expansion range from 1000 to 1200 deg. C. (1832 to 2192 deg. F.) with pressures of a few atmospheres. During expansion the temperature drops 150 to 350 deg. C. (300 to 660 deg. F.) With a temperature drop of 150 deg. C. a velocity of 600 metres per second (1968 ft. per sec.), and with a drop of 350 deg. C. (660 deg. F.) a velocity of 850 metres per second (2790 ft. per sec.) is attained. The peripheral speed of a single stage rotor should be about one-half the jet velocity. The efficiency curve of the turbine is rather flat near its maximum so that at the highest possible peripheral speeds a fairly good efficiency is obtained.

"Water injection can be used to reduce the blade temperature, but most of the heat is used to generate steam. Water jackets have the same disadvantage. To lower the temperature by further expansion requires the application of an exhauster, which could only be done at the cost of efficiency. The Lorenzen turbine overcomes the difficulty by suitable construction.

"The air used for cooling must necessarily have sufficient velocity to carry away the heat as fast as it passes through the hollow blade walls. This is accomplished by converting static pressure created in the compressor wheel to velocity of air flow; i.e., if the peripheral speed of the blades is about 1050 feet per second then an air velocity of about 820 ft. per sec. is obtainable, which will cause a heat transfer of 572 Kg.-cal. per hr. per deg. C. (117 B.t.u. per sq. ft., per hr., per deg. F.)

"The hollow blades used in the turbine are of special air-hardening steel, cold drawn, with a tensile strength of 142,000 lb. per sq. in. A wall thickness of 0.01 in. is used. Cooling is effective. The gases flow between the blades at a relative velocity of 350 to 400 metres per second (1150 to 1475 ft. per sec.) and a temperature of about 700 deg. C. (1292 deg. F.) A heat transfer of about 154 B.t.u. per sq. ft. per hr. per deg. F. is attained.

"In tests on exhaust gas turbines a temperature of 1535 deg. F. was measured ahead of and 1607 deg. F. back of the turbine. This increase in temperature was due to incomplete combustion and afterburning. A blade temperature (as indicated by color) of from 536 to 570 deg. F. was noted.

"A small turbine built to run at 30,000 r.p.m. was operated at 40,000 r.p.m., run up to 48,000, and burst at 50,000 r.p.m. This is mentioned to indicate the inherent strength of the blade design."

Fuel-Oil Progress Report

In the discussion following his paper Dr. Lorenzen admitted that as a prime-mover his turbine could be operated efficiently only when the hot gases could be used to preheat the ignition air or for other purposes. Approximately three times as much air as is needed for combustion is required for cooling. When this additional heat can be utilized overall efficiencies of from 85 to 90 per cent are attainable, he said.

Wiley Butler, in presenting the second progress report on Research in Diesel Fuel-Oil Specifications, stated that while the tentative specifications previously

Possible as Economical Prime Mover

By Edmund B. Neil
Director of Research
Chilton Class Journal Co.

Practical application is possible of the theory brought out in three papers on oil spray experiments and fuel injection systems delivered at the State College Meeting of the A. S. M. E.

These papers, by Carlton Kemper, P. H. Schweitzer and Addison M. Rothrock, will be summarized by Mr. Neil in an early issue of Automotive Industries - - - -

established (See *Automotive Industries*, August 10, 1929) had not met with complete success, it was now up to the engine manufacturers and others interested in oil specification standards to outline the future plan which the Research Committee should follow. Greater difficulty had been experienced with the specification for the "heavy oil" than with that for the "light oil" which has possibly a broader application from an automotive standpoint. Matters relating to permissible Conradson carbon content, increased cost of better fuels, and whether engine makers were willing to improve their designs to meet the specifications or wanted oil of the higher quality necessary for existing types were discussed without any conclusive opinions being expressed. It was planned to hold further discussions of these problems.

Nitralloy for Diesels

C. R. Alden, Ex-Cell-O Aircraft & Tool Co., in his paper on "Nitride Hardening of Alloy Steel for Diesel Engine Use," presented a long list of uses for material subjected to this treatment and stressed its value for details of the fuel injection system, particularly pump plungers and bushings, by-pass valve stems, and guides and distributor disks "where extreme precision is required and danger of scoring is invited by close operating clearances with absence of good lubrication."

Comparing the cost of Nitralloy with carburizing steels he disclosed the following figures:

Nitralloy		$0.14 per pound			
S.A.E. 1020		0.07 per pound			
S.A.E. 3115 and 2315		0.10 per pound			
	Electrical Energy Consumed	Cost	Ammonia Consumed	Cost
60 hr. run	237 kw. hr.	$3.08	1080 cu.ft.	$8.21

These figures were for a small furnace of 300 lb. or 1½ cu. ft. capacity.

In the discussion following Mr. Alden's paper it was brought out that a coating of powdered tin oxide and glycerine can be used in place of a metallic tin coating as an effective means of preventing nitriding of the surface when hardness is not desired. However, when this preventative is used the surface cannot later be nitrided, even after its removal. The tin oxide treatment is considered effective and satisfactory for the coating of threads, even those of small pitches, up to 20 per inch.

In using nitriding as a hardener for cylinder liners, Mr. Alden stated that there was no objection to hardening both the inside and outside surfaces although the tin oxide coating could be used as a preventative on the outside surface. The possibility of using nitrided piston rings was mentioned, but if these are to be used it would be necessary to fit them before hardening or else resort to costly methods of fitting due to the extreme hardness of the surface.

Eliminating Shaft Bushings

In the discussion following the paper by P. B. Jackson, Aluminum Co. of America, "Some Phases of Light Weight Diesel Engine Design," it was stated that nitrided crankshaft journals make possible the use of forged aluminum connecting rods without bushings when the rod bearing is diamond-bored. It was thought that the elimination of the conventional bearings promised satisfactory results even on engines larger than the high-speed racing car types where the operation of the connecting rod directly on the nitrided surface has been tried previously.

Results of efforts to obtain reliable data relating to oil engine operating and power generation costs were presented in an elaborate and obviously painstaking report by Franz Eder.

Of possible automotive interest may be mentioned the prejudice against gear drives brought out by J. Barraja-Frauenfelder in his paper on "Gear Drives for Motorships." This parallels the expression of similar objections to the use of reducing gears for aircraft engines.

Abstracts of other papers presented at the Oil Power Conference, especially those dealing with oil-spray experiments and injection system developments, will be presented in a succeeding issue of *Automotive Industries*.

Mechanical Properties of Aluminum

Preparation, heat treatment series of aluminum-base spe percentages of copper,

By T. W. Downes,
U. S. Naval Aircraft

THE fact that certain elements and compounds contained in a number of light aluminum alloys are more soluble in solid aluminum at elevated temperatures than at room temperature makes it possible to improve greatly the mechanical properties and increase the hardness of these alloys by suitable heat treatment. In the case of sand castings which are amenable to heat treatment, solubility is a function of both temperature and time, and in order to retain the soluble constituents in solution at ordinary atmospheric temperatures, the alloy must be held for a certain predetermined length of time at the high temperature and cooled rapidly to room temperature.

Copper is probably the most important of all of the elements used for alloying with aluminum. In the light aluminum alloys this element is used in quantities up to about 10 per cent or somewhat more, with or without other alloying elements in various amounts, but the binary alloy containing about 3.5 to 5 per cent of copper constitutes the base of the series of alloys, both wrought and cast, which respond most vigorously to heat treatment. Copper forms with aluminum the compound $CuAl_2$, and it is this constituent which is so effective in increasing the strength and other properties.

At ordinary atmospheric temperatures aluminum will hold in solid solution at most somewhat less than 0.5 per cent of copper, whereas at slightly below its melting point approximately 5 per cent of copper can be retained in solution. If an alloy of aluminum and copper containing about 4 per cent of the latter be heated to 525 deg. C. (977 deg. Fahr.), or thereabout, for a sufficiently long, continuous period of time, the copper will be dissolved by the aluminum, and if quickly cooled, as by quenching in water, substantially no copper will be rejected by the aluminum and marked changes in the characteristics of the alloy will result. Subsequent reheating of the alloy for certain lengths of time at temperatures usually not over about 150 deg. C. (300 deg. Fahr.), a process termed artificial aging, will cause further increase in strength and hardness at the expense, usually, of some ductility. Mg_2Si, a compound of magnesium and silicon, is also known to be a potential factor in the response to heat treatment of aluminum alloys containing these elements.

The improvements in the properties of certain aluminum alloy sand castings which can be effected by heat treatment is truly remarkable. Although not so much percentage increase in strength is possible as with certain carbon and alloy steels, results involving as much as 100 per cent increase in tensile strength and nearly 400 per cent increase in elongation, or ductility, have been achieved under production conditions by certain combinations of chemical composition and heat treatment. Thus, among other results recently obtained at the Naval aircraft factory in an investigation of this subject, ultimate tensile strengths up to 47,000 lb. p. sq. in. and elongation up to 14.5 per cent in 2 in. were exhibited by heat-treated, sand-cast specimens, duplicates of which showed corresponding properties of 22,000 and 3.0, respectively, in the condition as cast in green sand.

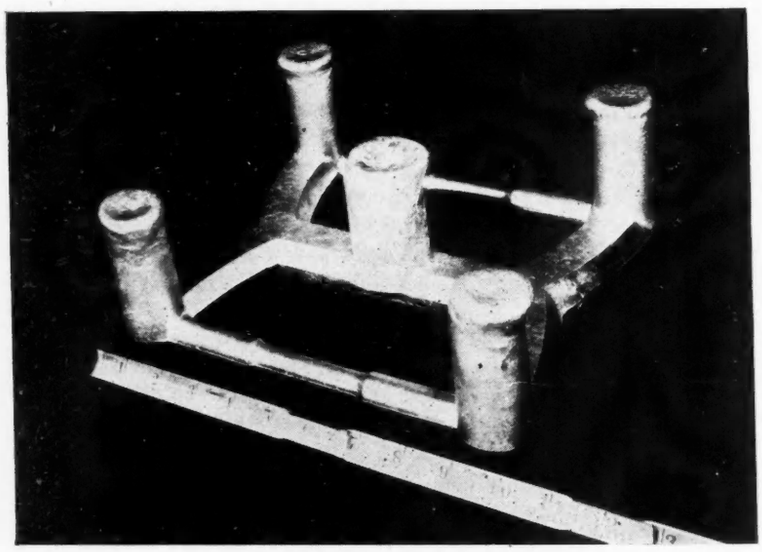


Fig. 1—Method of casting aluminum alloy tensile test specimens. Metal is poured at the center, with one riser at each end of each specimen - - - - - -

In the work to which reference is made above, a series of aluminum-base alloys was prepared in which the percentages of aluminum, copper, silicon and magnesium were intentionally varied. Tensile test coupons were cast from each heat in green sand molds in the form shown in Fig. 1. These were heat-treated by various methods and tested in tension without machining, the ultimate tensile

Alloys for Castings Improved by Heat

and tests are made of a cimens containing varying silicon and magnesium.

Metallurgist
Factory, Philadelphia

strength and percentage elongation in 2 in. being measured. Determinations of the freezing point were made of two of the alloys, from one of which the best mechanical properties had been obtained. Brinell hardness of a number of specimens covering a considerable range of strength and elongation values was determined. In order to study the effects of heat treatment, both correct and incorrect as indicated by the results of tension tests, upon the microstructure, sections of representative specimens were prepared and examined under the microscope.

In preparing the alloys for casting, a clay-graphite crucible capable of containing about 20 lb. of aluminum was used for melting down the charge. The crucible was not covered, but care was taken to prevent impingement of the flame or products of combustion upon the surface of the metal. The temperature of the melt was regulated through the use of a thermocouple inserted at intervals. About half of the aluminum was first melted. The temperature was then held at 1300 deg. to 1350 deg. Fahr. and the alloying materials were added from time to time with the remaining aluminum. Copper was added in the form of fragments of thin sheet, which readily dissolved in the aluminum. Silicon was added in the form of a cast aluminum-silicon alloy containing about 5 per cent of silicon. Magnesium, when used, was introduced as short bars of the pure metal and was submerged in the molten alloy a few minutes before casting, being held at the bottom of the crucible by a heavy iron wire until completely dissolved. Stirring was done in such a manner as to disturb the surface oxide film of the metal as little as possible.

Most of the experimental heats were not fluxed. When, however, fluxing was done, zinc chloride was used as the flux, and just before casting about 0.25 oz. of the chloride to 20 lb. of the alloy was held at the bottom of the melt in a small inverted iron cup until action ceased. The metal was then thoroughly skimmed and cast.

In the work of heat treatment of the cast specimens, heating was done in a small laboratory electric furnace. The furnace was not equipped with automatic control, and during certain periods of the majority of the heat treatments the furnace temperature was subject to variation produced by fluctuations in line voltage. Because of this it is believed that many of the strength and elongation values are below the values which would have been obtained had temperatures been regulated more closely. Heating periods up to 72 hr. at temperatures from 500 deg. to 540 deg. C. were used, at the end of which the specimens were quenched in water at room temperature. Subsequent aging was done, usually for two hours, at temperatures up to 260 deg. C. In some cases aging consisted of immersion for six hours in boiling water (100 deg. C.).

Specific, complete heat treatments accompanying the results of the tension tests given in Tables I and II. In order to demonstrate the effect of heat treatment in improving the mechanical properties of the cast metal a number of specimens were tested in the condition as cast. A series of groups of specimens cast under production conditions were heated for various periods of time up to 30 hr. before quenching in water to determine the effect of the various treatments upon the mechanical properties.

Results of the work to determine the most satisfactory chemical composition and heat treatment are given in Table I. The chemical compositions given are not

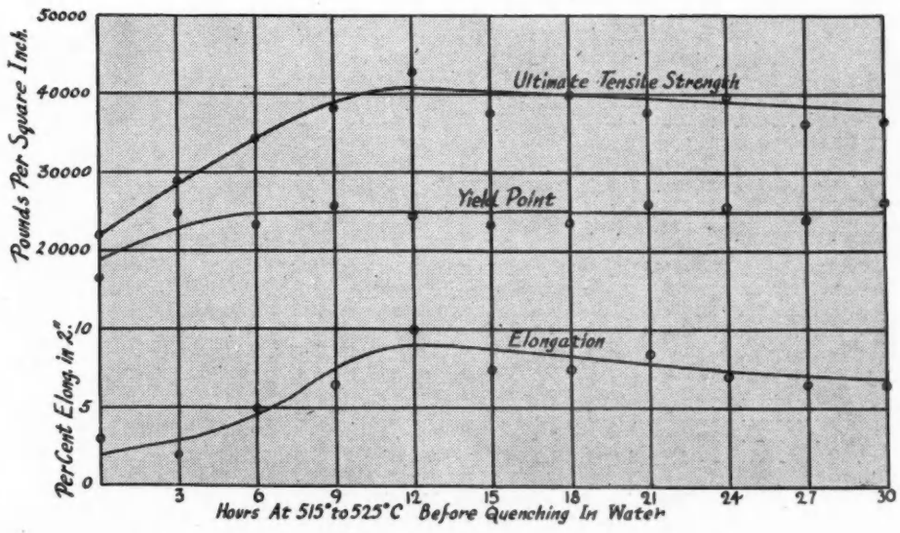


Fig. 2—Properties of heat treated cast aluminum alloy. Curves plotted from data of Table II - - - -

the results of chemical analyses but are those to which the weights of the materials entering the charge were made to conform. In making up the charges, a composition of aluminum 95 per cent and silicon 5 per cent was assumed for the aluminum-silicon alloy used to introduce the silicon. The aluminum, copper and magnesium were assumed to be pure metals. The iron content of the various alloys is believed to be fairly constant at about 0.55 per cent. In the heat-treatment designations the letters have the following meanings: H—hours; W—water; A—aged; NA—not aged; BW—boiling water. The expression 51H515-530W(30)-A2H205 should be interpreted to mean that the specimens were heated for 51 hours in the temperature range of 515 to 530 deg. C., quenched in water at 30 deg. C. and aged for two hours at 205 deg. C.

Much was learned from the first seven experimental heats regarding methods of preparation of the alloy, casting, heat treatment and the effect of varying the copper and silicon contents. Subsequent heats reflect the experience gained and the effect of further slight composition variations including additions of magnesium and the effect of fluxing. The somewhat erratic nature of the results may suggest contradiction in a number of cases. This, however, is mainly due to the persistence of flaws and non-metallic inclusions in the specimens, a condition which was later largely overcome and practically eliminated by careful manipulation.

In Fig. 2 graphs are shown of the results of tension

Specimen No.	Tensile Strength (p.s.i.)	Per Cent Elongation in 2 in.	Heat Treatment
Heat No. 1. Cu 4.0%; Si 0.50%; Al bal.			
1.	13,600	6.0	None
2.	15,400	7.5	None
3.	15,600	7.5	None
4.	15,800	5.0	30H525W-NA
5.	22,600	8.0	Same
6.	23,000	6.0	Same
7.	29,200	3.0	30H525W-A2H150
8.	36,800	1.0	Same
9.	36,300	1.0	Same
Heat No. 2. Cu 4.0%; Si 1.0%; Al bal.			
1.	16,400	2.0	None
2.	18,000	2.5	None
3.	23,800	1.0	30H500-540W-NA
4.	26,300	1.0	Same
Heat No. 3. Cu 4.25%; Si 0.50%; Al bal.			
1.	15,700	2.0	None
2.	15,700	2.5	None
3.	21,600	4.0	None
4.	28,300	3.0	29H500-540W-NA
5.	24,100	2.5	Same
6.	22,800	2.0	Same
7.	28,200	4.5	53H500-540W-NA
8.	31,700	5.0	Same
9.	32,100	5.5	Same
Heat No. 4. Cu 4.50%; Si 0.50%; Al bal.			
1.	21,100	8.0	None
2.	17,350	5.0	None
3.	17,950	3.5	None
4.	29,650	4.5	29H540W-NA
5.	27,500	4.5	Same
6.	30,100	3.5	Same
Heat No. 5. Cu 4.75%; Si 0.50%; Al bal.			
1.	20,000	5.5	None
2.	15,100	4.0	None
3.	16,550	3.0	None
4.	24,100	2.5	28H530W-NA
5.	26,200	2.5	Same
6.	29,800	3.0	Same
Heat No. 6. Cu 4.50%; Si 0.25%; Al bal.			
1.	16,500	3.0	None
2.	18,350	4.0	None
3.	17,550	4.0	None
4.	23,750	4.0	28H500-525W-NA
5.	24,600	0.0	Same
6.	26,150	2.5	Same
7.	31,900	6.0	28H500-525-A2H150
8.	25,200	3.0	Same
9.	27,500	4.0	Same
Heat No. 7. Cu 4.0%; Al bal.			
1.	22,200	8.5	None
2.	25,900	10.0	30H520W-NA
3.	26,200	9.0	Same
4.	26,000	10.5	30H520W-A2H100(BW)

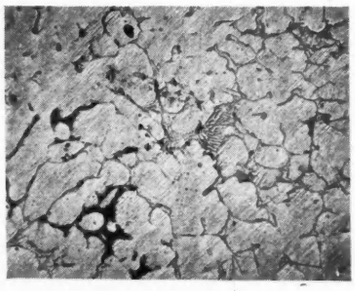


Fig. 3—Specimen cast, tensile strength 21,600, elongation 3.0 per cent. Microstructure magnified 50 times - - - -

Fig. 4—Heated for 26 hrs. at 500-530 deg. C. Tensile strength 39,000 and elongation 11.0 per cent. Microstructure magnified 50 times - - - -

Table I. Compositions, Properties
Aluminum

Compositions are not the results of chem
and chemical compositions as determined
Explanation of the heat-treatment

tests of a series of groups of specimens held in the heat treatment temperature range (515 to 525 deg. C.) for various periods of time up to 30 hours, the object of the work being to determine the shortest heating period necessary to produce the best properties. All specimens were cast from the same heat of metal of the composition given at the head of the table. Quenching was done in water at room temperature, and artificial aging was omitted. Here again the heat treatment temperature was not automatically controlled, which condition may account for the peak in the mechanical properties occurring at a soaking period of 12 hours rather than at a point involving a longer treatment.

The freezing point of the alloy actually containing copper 4.29 per cent, silicon 0.90 per cent, iron 0.57 per cent and aluminum the balance was determined to be 644 deg. C. (1191 deg. Fahr.). That of the alloy containing copper 4.38 per cent, silicon 1.05 per cent, iron 0.57 per cent and aluminum the balance occurred at 640 deg. C. (1184 deg. Fahr.).

The Brinell hardness of heat-treated specimens of the composition given below varied from 61 to 86, using a 500-kg. load, according to the heat treatment received, the specimens showing the higher strengths having the greater hardness. In Table II, following, is given the average relationship between tensile strength and Brinell hardness as shown by specimens from experimental heats Nos. 10, 11, 12 and 13, in Table I.

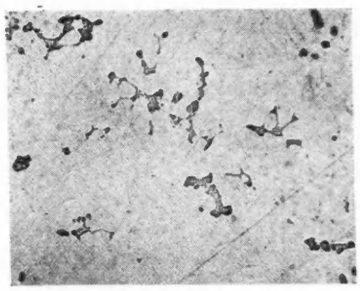


Fig. 5—Specimen heated for 49 hr. at 500-530 deg. C. Tensile strength 38,900 and elongation 11.0 per cent. Microstructure magnified 50 times - - -

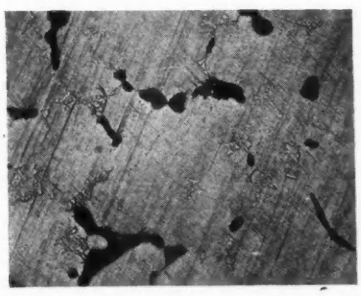


Fig. 6—Specimen overheated in heat treatment. Tensile strength 19,500 and elongation 1.0 per cent - - - - -

and Heat Treatments of Cast Alloys

ical analyses but are based on the weights by actual analysis of the material charged. symbols is given in the text

Specimen No.	Tensile Strength (p.s.i.)	Per Cent Elongation in 2 in.	Heat Treatment
Heat No. 8. Cu 4.25%; Si 0.50%; Al bal.			
1.	23,000	5.5	None
2.	34,500	7.0	28H520-530W-NA
3.	33,500	10.0	Same
4.	23,800	6.0	28H520-530W-A2H100(BW)
Heat No. 9. Cu 4.50%; Si 0.50%; Al bal.			
1.	21,100	5.5	None
2.	29,700	2.5	28H520-530W-NA
3.	30,400	2.5	Same
4.	31,400	6.5	28H520-530-A2H100(BW)
Heat No. 10. Cu 4.25%; Si 0.50%; Al bal.			
1.	31,200	9.5	26H500-530W-NA
2.	21,560	4.5	26H500-530W-A2H100(BW)
3.	32,300	9.0	26H500-530W-A6H100(BW)
4.	30,300	7.0	49H500-535W-NA
5.	38,500	9.0	49H500-535W-A6H100(BW)
Heat No. 11. Cu 4.25%; Si 0.50%; Al bal. Note: This heat same in composition and heat treatment as heat No. 10, but fluxed with $ZnCl_2$.			
1.	34,600	9.5	26H500-530W-NA
2.	33,000	11.0	26H500-530W-A2H100(BW)
3.	35,800	9.0	26H500-530W-A6H100(BW)
4.	34,000	8.5	49H500-535W-NA
5.	38,900	11.0	49H500-535W-A2H100(BW)
Heat No. 12. Cu 4.25%; Si 0.50%; Mg 0.15%; Al bal. Note: This heat fluxed with $ZnCl_2$.			
1.	39,400	5.5	72H500-530W-NA
2.	39,500	7.0	72H500-530W-A2H100(BW)
3.	37,400	5.5	72H500-530W-A6H100(BW)
4.	36,600	4.5	Same
Heat No. 13. Cu 4.25%; Si 0.50%; Mg 0.075%; Al bal. Note: This heat composed of equal weights of gates and risers from heats No. 11 and No. 12. Fluxed with $ZnCl_2$.			
1.	37,300	8.5	52H510-530W-A2H150
2.	42,800	2.0	52H510-530W-A2H205
3.	35,100	4.0	52H510-530W-A2H100(BW)
4.	37,800	5.0	Same
5.	40,000	7.0	52H510-530W-A6H100(BW)
6.	39,000	5.5	Same
Heat No. 14. Cu 4.35%; Si 0.50%; Al bal.			
1.	22,400	4.5	None
2.	35,400	4.0	51H515-530W(30)NA
3.	36,800	4.0	51H515-530W(30)-A2H100(BW)
4.	40,000	5.5	51H515-530W(30)-A2H150
5.	41,000	3.5	51H515-530W(30)-A2H205
6.	35,400	3.5	51H515-530W(30)-A2H260
Heat No. 15. Cu 4.35%; Si 0.75%; Al bal.			
1.	23,000	4.0	None
2.	35,950	3.5	51H515-530W(30)-NA
3.	39,100	6.0	51H515-530W(30)-A2H100(BW)
4.	41,300	6.5	51H515-530W(30)-A2H150
5.	40,400	6.5	51H515-530W(30)-A2H205
6.	32,400	3.5	51H515-530W(30)-A2H260

Photomicrographs were taken at a magnification of 100 diameters, of the microstructure of sections of an alloy held at 515-525 deg. C. for various periods up to 30 hr. before quenching in water. The specimens were not artificially aged. Compositions, as calculated from weights and actual chemical analyses of materials entering the charge were: Cu 4.35 per cent; Si 0.95 per cent; Fe 0.55 per cent; Al balance. In the condition as cast and after heat treatment, these are shown in Figs. 3 to 6, inclusive. The structure shown in Fig. 6 was the result of overheating to the point of incipient fusion of the metal.

Tensile Strength (p.s.i.)	Brinell Hardness (500 kg. load)
31,300	61
32,100	65
34,300	70
37,100	74
39,000	80
42,800	86

TABLE II—Average test relationship

In order to obtain the best results as regards mechanical properties, freedom from undesirable nonmetallic inclusions and other defects, close regulation of the chemical analysis, the preparation and the heat treatment of the alloy is absolutely essential.

Erratic Group Results

The rather erratic nature of many of the groups of results given in Table I and the rather unfavorable comparison of most of the strength and elongation values with results which have since been obtained at the Naval aircraft factory using the above composition and heat treatment are known to be due to faulty manipulation in preparing the alloys and inadequate control in heat treatment. For example, when stirring was done, insufficient precaution was taken to prevent mixing into the molten metal particles of the film of oxide which formed on its surface. Aluminum oxide so stirred into the metal is apparently never rejected or eliminated, and appears in the castings, seriously lowering both the strength and elongation values. The film of oxide on the bath prevents further oxidation, and for this reason is of great value. If not disturbed the quantity of the film apparently remains constant, but if disturbed additional oxide forms wherever the metal has been exposed.

Stirring Needs Care

It is important, therefore, when stirring that the surface film of oxide be disturbed as little as possible. In the early part of the experimental work stirring was not done, as it was assumed that natural diffusion of the various elements throughout the metal would be sufficiently rapid and complete to effect homogeneity in a reasonably short time. It was found, however, that diffusion is slow and that stirring must be done, but that when all ingredients are once intimately mixed there is no danger of separation.

Much of the variation within the groups of specimens is also attributed to inability to hold the temperature of heat treatment within reasonably constant limits. Recessions in temperature during heat treatment, even for short periods, from the temperature which it is intended to maintain, operate to throw out of solid solution quantities of alloying elements, or compounds, thereby making for reduced mechanical properties, unless additional time is allowed to accomplish the re-solution of these ingredients.

The importance of keeping melting and pouring temperatures at the practicable minimum, because of the effect of higher temperatures in reducing the mechanical properties of the casting and increasing the shrinkage, is well known.

Fluxing of the metal with about 1 oz. of zinc chloride per 100 lb. of metal just before casting effects an improvement in the mechanical properties of the cast metal. In this investigation increases of about 2700 p.s.i. in the ultimate tensile strength and 1.0 unit in the per cent elongation in 2 in. were indicated.

Conclusive evidence as to whether or not substantial improvements in the mechanical properties of the alloy will result from heating periods of much longer duration than 12 hours is lacking. Certain results of tension tests, also the microstructure, indicate that some improvement may be expected. Other results are indifferent or contradictory. It is certain, however, that any increase in properties due to prolonged heating periods at the temperature of heat treatment is far from being proportional to the time of heating.

Maximum Properties Conjectural

Exactly when maximum properties would be developed is conjectural. The effect on the microstructure, however, of long heating periods is shown by Figs. 3, 4 and 5 by the progressive reduction in the quantity of the copper-aluminum compound remaining out of solid solution as the length of time of heating before quenching is increased.

The influence of the time of aging at a temperature of boiling water (100 deg. C.) is believed to be very slight, if any, indifference among the results being noted. Increasing the aging temperature, however, up to about 205 deg. C. generally effected an increase in the strength, but little, if any, change in the elongation. Marked decreases in both strength and elongation resulted from aging above this temperature. The purpose of aging in boiling water is to preclude any possible subsequent change in properties from aging under ordinary atmospheric conditions.

The effect of silicon upon the properties of the alloy appears to be most marked in the elongation values, and for the best results the quantity of this element should apparently be from 25 to 50 per cent greater than that of the iron when the latter is about 0.50 to 0.60 per cent. A comparison of the results obtained indicates that such a ratio in the contents of these two elements is probably responsible for an improvement of nearly one unit in the per cent elongation after heat treatment over the value corresponding to equal percentages of silicon and iron. Complete absence of iron from the metal would probably make for higher mechanical properties. It has been reported by several investigators that the effect of silicon is to alter the needle-like form in which the iron-alumi-

num compounds occur in the alloy by promoting spheroidizing and partial solution of these constituents, thereby making for a reduction in brittleness.

Magnesium is not necessary to the success of this alloy. Its presence in amounts up to 0.15 per cent produces a moderate increase in ultimate tensile strength but a proportionately greater decrease in per cent elongation. It was concluded that very satisfactory properties, more evenly balanced as regards ultimate tensile strength and elongation, are possible in its absence, and for this reason no further work on alloys containing this element was done. Increase in hardness and a natural aging effect due to the presence of magnesium in alloys of this type have been reported.

Theoretically, with this alloy a somewhat higher temperature in heat treatment than that given above might be used without fear of overheating, but because of the danger of the presence of undue quantities of impurities in the materials charged, the effect of which would be to lower the temperature of incipient fusion of the alloy, temperatures much above 525 deg. C. should be avoided in heat treatment.

It is interesting to note from the strength and corresponding Brinell hardness values obtained in this work, that approximately the same relationship between these properties, namely, Brinell hardness multiplied by 500 equals very nearly the tensile strength in lb. p. sq. in., obtains for this alloy after heat treatment, as well as for many steels.

As regards casting qualities, the metal is given a rating of fair. Although somewhat less fluid than some of the other light casting alloys, if not overheated or held too long in the molten state before pouring, there is no danger of excessive shrinkage or porosity. The tendency to contain pin holes is not serious in thin sections of castings, and such sections are often practically free from this form of defect. In heavy sections of castings, however, this trouble may, under certain or special conditions, reach objectionable proportions.

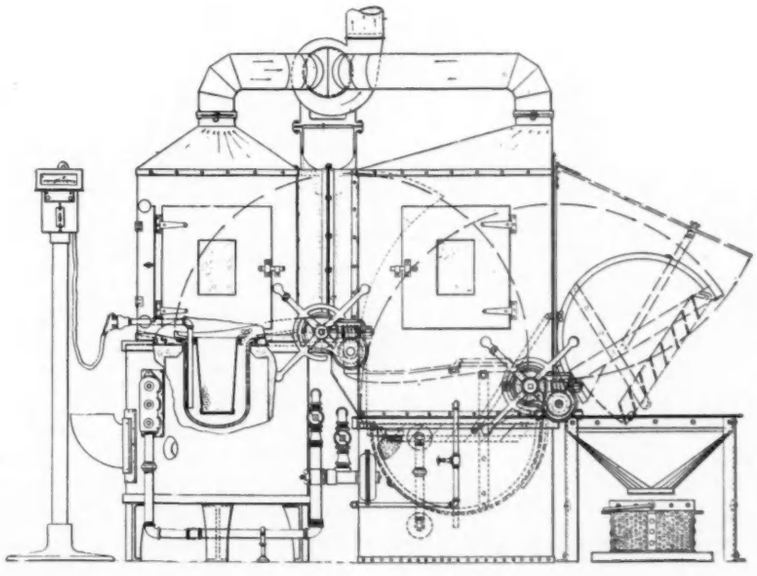
Automatic Case Hardening Furnace

AN entirely automatic process of case hardening is provided by the Hyro Furnace, recently placed on the market by the Hyro Manufacturing Co., Inc., New York City. The equipment may be used as single right or left hand units, or in batteries consisting of pairs.

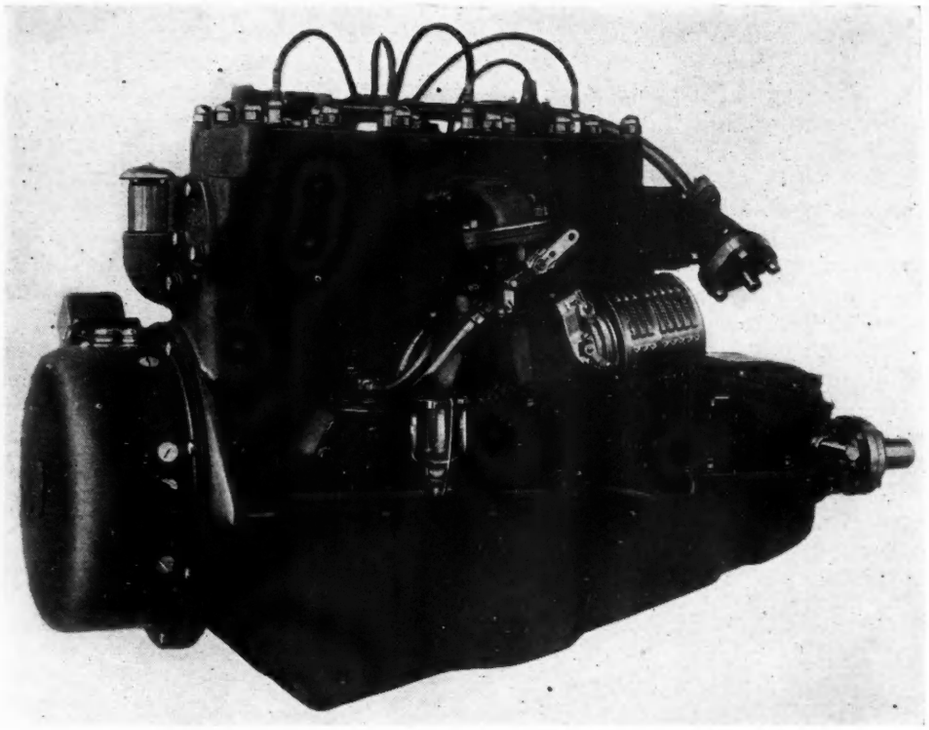
The furnace and quenching tank are self-contained, each being covered by a hood, both hoods being joined together by a sealed passageway. The windows are provided with Pyrex glass to withstand heat and shock and permit the work to be inspected without opening the doors.

Work is fed with a scoop into a basket submerged in the hardening solution. When the bath has reached the proper temperature and the work has remained in the bath the proper length of time, it is swung by the operator out of the bath by means of a counterweighted carrier operated by a handle.

The carrying mechanism moves in a semicircle within the hoods and sealed passageway, and all the products of combustion, as well as the poisonous fumes from the hardening solution, go up the flues. The work is discharged from the basket into the quenching tank, which is equipped with a baffle plate designed to separate or "break up" the work as it is dumped into the quenching tank. After the load has remained in the quenching tank long enough, a forward movement of the handle swings the perforated tray to a position above the hopper, automatically emptying the work through the hopper into a basket or any other receptacle used for receiving the finished work.



Schematic line drawing of a Hyro Unit for automatic case hardening



The Lycoming Model UA, 40 hp. marine engine with reverse gear and front-mounted generating and starting unit

Lycoming Enters Marine Field With 40 hp. Engine

Model UA (as illustrated) represents intermediate between outboard and more powerful inboard types of powerplants. Unit is completely equipped with built-in accessories - - - - - - -

LYCOMING MANUFACTURING COMPANY, Williamsport, Pa., has entered the marine engine field with its new Model UA. This is said to be of a type intermediate between outboard marine engines and the larger, more powerful and more expensive standardized inboard engines, and is expected to find its chief field of application in what will probably become known as the "Junior Runabout" type of boat. It is equipped with all of the accessories that usually go with the more pretentious inboard marine powerplants, such as a built-in reverse gear, electric starter, oil cooler, flame arrester, tachometer take-off, thermo-gage connection, and mechanical fuel pump.

The engine was specially designed for the heavy-duty service of marine work, and every completed engine is given a test run during which it must develop its full rated power and meet other requirements. After the run it is partly dismantled for final inspection: The oil pan is removed, the bearing caps are taken off, and the bearings are examined, these precautions being taken to guard against failure in service.

With a bore of 3⅛ and a stroke of 3⅞ in., the four-cylinder engine has a displacement of 119 cu. in. Its compression ratio is 5.5 to 1, and its power rating, 40 hp. at 3200 r.p.m. Completely equipped, the weight of the engine is 390 lb.

A feature of the engine is its compact design, which results from incorporation of the exhaust and intake manifolds in the cylinder block casting, and the use of a single-unit 12-volt starter-generator mounted on the front of the engine in the position usually occupied by the flywheel. The armature, being of large diameter, takes the place of a flywheel, and the gear drives required with the conventional two-unit electrical system are eliminated.

The oil cooler is mounted on the side of the cylinder block, its shell or body being integral with the cylinder-jacket cover-plate. In this cooler the oil flows through tubes surrounded by water, which is the exact reverse of the usual arrangement. This design was adopted to prevent water from being trapped in the cooler by capillary action when the engine is drained and cause damage by freezing. The core of the cooler can be quickly removed for cleaning.

A Joe's reverse gear of special design is built into the engine, and completely enclosed. Its clutches are easily adjusted by taking off the cover plate on the gear housing.

Rigid Drive Feature

A stuffing box prevents leakage around the tail shaft, and an annular ball bearing takes up the propeller thrust. In place of the engine sleeve generally supplied by the reverse-gear manufacturer, there is provided an integral extension of the crankshaft which carries the main drive pinion. This shortens the engine considerably and makes for a more rigid drive.

Water is circulated by a gear pump running at half crankshaft speed. Its body and gears are of bronze and the shafts of stainless steel. No bolts or studs are required to attach the pump to the engine, as the driven end of the pump body is turned to fit a bored hole in the side of the cylinder block and the pump is prevented from rotating by means of a set screw. The end of the shaft is squared and fits into a corresponding squared hole broached in the driveshaft. After loosening the set screw and disconnecting the water hose, the pump can be lifted out for inspection or repairs. Water enters the pump on the upper side, thus keeping it filled (and primed) when the engine is stopped.

All gas passages are cast within the cylinder block, and are completely surrounded by water jackets, except where the exhaust and intake walls coincide to form a hot spot. The intake being above the exhaust, the heavier fuel particles, settling to the bottom wall, are heated and vaporized by the exhaust which comes in direct contact with the same wall. The exhaust outlet is usually at the rear of the cylinder block, but if it is desired to have it at the other end, it is only necessary to exchange the exhaust elbow with the front cover plate and make a slight change in the water outlet. All water is discharged into the exhaust line through a nozzle projecting far enough into the exhaust elbow to prevent water being drawn back into the cylinder jackets when the engine is stopped.

The crankshaft is carried in three main bearings of 1⅞ in. diameter, the front and rear being 1⅝ in. long each and the center 2 in. These are bronze-back, babbitt-lined bearings. Connecting rod bearings are of white metal which is spun into the steel forgings; they are 1¾ in. in diameter and 1½ in. long.

Lubrication is by pressure to the main and camshaft bearings. Crankpin bearings are oiled through passages drilled in the crankshaft. Cams and tappets are sprayed with oil thrown from small jet holes drilled in the connecting rod bosses and registering once during each revolution with holes drilled in the crankshaft. Oil leads to all the bearings are drilled through the crankcase webs. The pump is driven from the camshaft by helical gears at one-half engine speed. It is submerged in the sump and is self-priming.

Exhaust valves are of silchrome steel, and have a clear diameter of 1¼-in. and a 5/16-in. lift: intakes are of alloy steel and have a 1⅜ in. clear diameter and a 5/16-in. lift. The angle of the valve seats is 45 deg. Tappets are of the mushroom type and are fitted in two clusters of four each. A large opening in the side of the cylinder, normally closed by an aluminum cover, permits ready access to the tappets for adjustments. A feature of the design is that no accessories need be dismounted when tappets are to be adjusted.

A Delco-Remy distributor with full automatic spark advance is mounted at a slight angle and driven by helical gearing from the pump driveshaft, on the starboard side of the engine.

Pistons are of aluminum alloy, with invar struts. Three rings are fitted—two of them being compression rings and one an oil-regulating ring. Piston pins are ¾ in. in diameter and are clamped in the connecting rod, the bearing being in the pistons. Rods and pistons are matched on the basis of weight, the limit of variation being ⅛ oz.

Better Quality at Pierce-Arrow

(Continued from page 938)

Probably one of the finest water sand decks in the industry has been installed here, and is shown in good detail in Fig. 10. As evidence of the care with which this department is planned, note the conveniently located water tanks and the interesting illuminating arrangement consisting of closely grouped lamps with special reflectors. As in the other departments, the bodies progress on a timing conveyor, whose speed may be varied in accordance with production rate.

The interested observer is unusually impressed by the amount and severity of inspection imposed upon each individual operation. In fact, it might be well to note here that there is an inspector at every process station, although that is not shown on the work routing. These men ruthlessly reject the slightest defect, for it is well known to the paint shop organization that a slight defect may show up glaringly on the finished product.

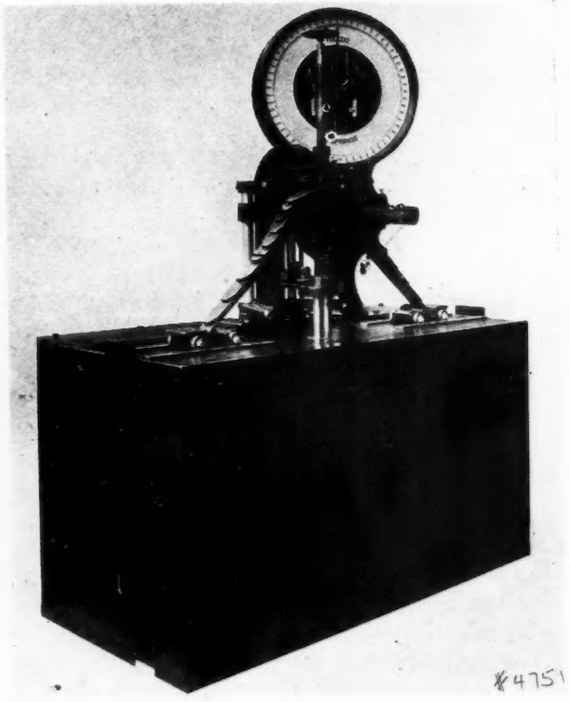
The Pierce-Arrow paint shop has been operating for a number of months, during which time a close check on the operation of each oven has shown gratifying results. The management is now confident that the paint shop will produce, in quantity and at lower cost, a better and more durable finish. Certainly, the visitor is impressed with the feeling that a paint job which passes their rigid inspection must be good.

NEW DEVELOPMENTS—AUTOMOTIVE

Toledo Auto-Gage Chassis Spring Scale

AN improved chassis spring-testing machine known as an Auto-Gage has been announced by the Toledo Scale Co., Toledo, Ohio. It measures the force necessary to deflect the spring a certain standard distance.

This chassis spring-testing Auto-Gage is said to have the advantage of greater speed of operation. Two hundred and seventy-five springs can



be tested in an hour. Because of this fact the machine can be placed in the production line and each spring tested without slowing up operations.

The Auto-Gage occupies only little floor space and is a self-contained unit, hence it is easily moved from one position to another. To make it easier to read the dial, the latter is placed close to the operator and provided with large, clear figures and widely-spaced graduations. Vital parts of the mechanism are protected against dust and dirt by enclosing them.

Automatic Lifting Magnet Controller

AN automatic lifting magnet controller with an "automatic drop" arrangement is announced by Cutler-Hammer, Inc., Milwaukee, Wis. The automatic drop feature relieves the lifting magnet operator of an extra operation of the master switch each time the magnet is unloaded, giving him more time to operate the engine and brake levers, thus saving time in loading and unloading. Although designed to operate with C-H "Red Top" lifting magnets, this new controller can also be used with any other make of magnet.

DeVlieg Supermil 31B Heavy Duty Machine

SPECIAL features of design, among other things providing rigidity of structure and positive-locked feed, are said to make the 31B Supermil, recently developed by the DeVlieg Machine Tool Company, Jackson, Mich., well suited to heavy duty accurate production work of large or small quantities. The plan of the Supermil slide involves a Vee and flat construction for accuracy. The bed is equipped with hardened and ground steel ways, giving enduring qualities. The gibbing comprises members front and rear bolted securely to the bed for the full length, the heel resting on a laminated shim.

The speed mechanism starting from the motor shaft comprises a main drive unit in the base, carrying a pair of reduction gears from the motor shaft to the main shaft, a Twin Disk multiple-

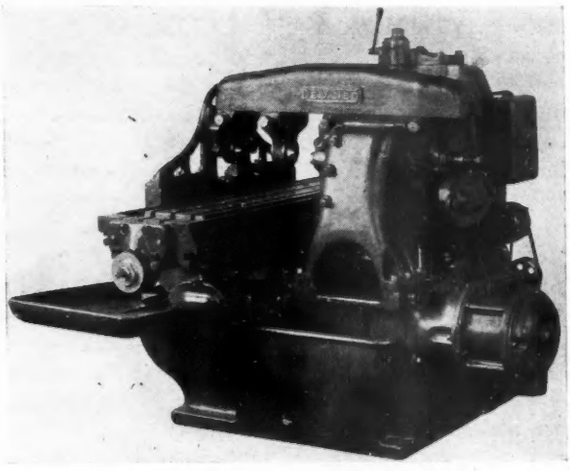


plate clutch, a pair of bevel gears and vertical spline shaft extending upward and into the spindle head. The feed mechanism provides movement to the table with a rapid traverse and power feed in either direction with selective controls. This mechanism is of two-unit construction, one for the rapid traverse and the other for power feed, with each directly connected to a double geared sleeve, splined to the feed screw. The rapid traverse operates the tables at constant rate of 180 in. per minute, while feed

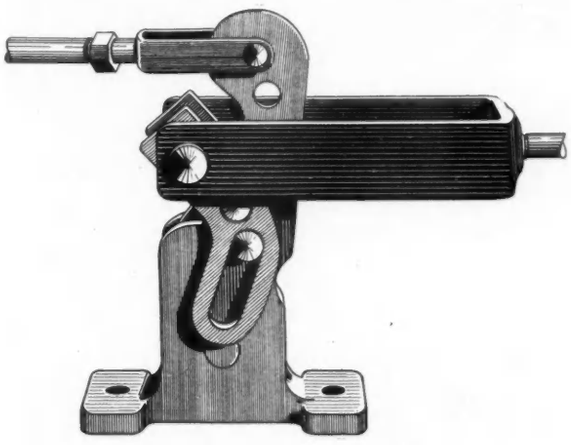
PARTS, ACCESSORIES AND PRODUCTION TOOLS

changes of from 1.8 to 20 in. per minute are obtained through pick-off gears located in the right-hand end of the bed. Net weights are as follows:

Table feed 30, 36, and 42 in.; net weight 7500, 7675, and 7750 lb. respectively. Two types of motor drive are available, the flange type as shown or the direct connected type, both of 10 h.p. capacity 1800 r.p.m.

Cleco Multi-Power Brake Booster

A DEVICE by means of which the clearance between brake shoes and drum can be taken up quickly and the reduction ratio in the brake rigging then reduced so as to obtain three times as much force of application for a given pedal pressure as would be obtained if the demultiplication ratio were the same as during the take-up, has been placed on the market by the Cleveland Pneumatic Tool Company of Cleveland, Ohio, through its Automotive Division, which is in charge of F. H. Burr. The device is referred to as a mechanical brake booster and is intended particularly for use on trucks and buses, though it is applicable also on passenger cars.



The device, which comprises a cam and lever, is incorporated in the brake rod back of the brake pedal. During the first 20 per cent of pedal travel the clearance between brake shoe and drum is rapidly taken up. This leaves more than 75 per cent of the pedal travel for the actual application of the brake, hence the demultiplication ratio can be made quite large and great braking effect obtained with slight pedal pressure.

It is claimed that with the Cleco Multi-Power brake it is not necessary to adjust the brakes very closely, since the clearance is taken up so quickly. Economy in the use of brake lining is also claimed, as the variable demultiplication tends to eliminate the practice of "riding" the brakes.

Economy Double-End Turning Machine

A FULLY automatic double end turning machine for rapid chamfering and pointing of bearing rollers, valve tappets, studs, etc., has been placed on the market by The Economy Engineering Co., Willoughby, Ohio. Fully automatic, it is necessary only to keep a supply of blanks in

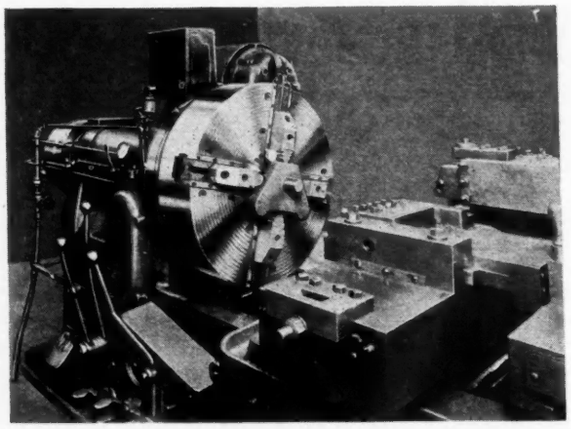
the hopper. These are fed automatically to the tools where each piece is gripped in the center and machined on both ends simultaneously. Delivery is also automatic and it is said that one operator can attend five machines.

Floor space required is 35 x 72 in.; net weight 3200 lb.

Hannifin Four-Jaw Duplex Air Chuck

ROUGH or finished parts of regular or irregular shape are said to be readily and accurately chucked in the new Hannifin Four-Jaw Duplex Chuck recently added by the Hannifin Manufacturing Co., Chicago, Ill.

Briefly, this chuck accurately centers work across two diameters regardless of variations from nominal dimensions in the two diameters; applies uniform pressure on all four sides, and permits loading and unloading the chuck jaws as quickly as with a conventional three-jaw air chuck. The fact that the chuck will take care of variations in dimensions across two diameters up to 3/8 in. indicates the wide range of irregular shaped work which can be handled.



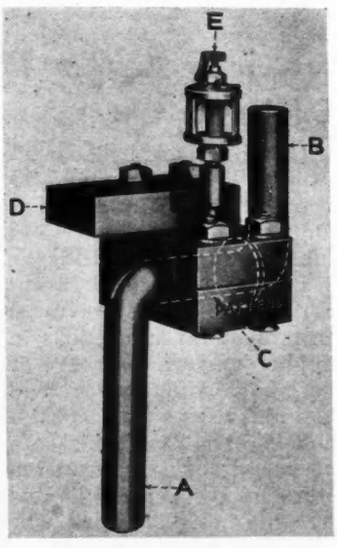
Another feature is that one pair of jaws can be arranged to compensate with each other.

Successful operation hinges upon their cylinder, which can best be described as a "two-in-one" cylinder. Two pistons are provided, the smaller one telescoping inside the larger. The bore in the larger piston becomes, in fact, the cylinder wall for the smaller one. The larger piston is connected to one pair of jaws by means of a draw tube and the smaller piston is connected with the other pair of jaws by means of a draw rod. The draw rod of the smaller piston passes through the draw tube of the larger one. The Duplex air cylinder is no larger in diameter than the standard rotating air cylinder, and the length is only slightly greater.

The Duplex Chuck is available in the following sizes: 15 in., 18 in., 21 in. and 28 in., Duplex air cylinders are furnished in 12 in., 14 in. and 16 in. sizes.

Kurth & Knapp Conveyor Safety Stop

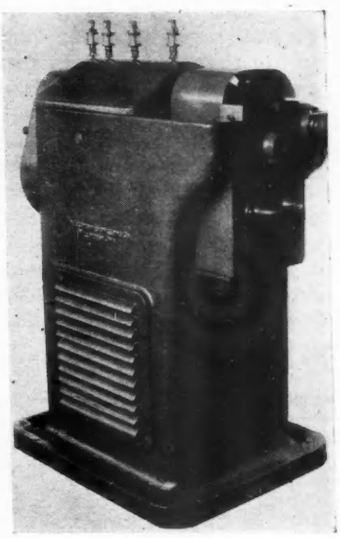
THE Safety Stop, a positive conveyor control designated to automatically stop the conveyor in the event of chain breakage on up or down grade is announced by the Kurth & Knapp Manufacturing Company, Detroit. If desired, it may be equipped with a limit switch, automatically shutting off power to the conveyor drive, thus stopping the whole system if the conveyor chain breaks.



The automatic stop consists of a one piece forged steel crank composed of a guard arm "A" and a lock arm "B" inserted in a bearing block "C" which is bolted rigidly atop the monorail conveyor. The guard arm "A" oscillates over trolley wheels as they pass at normal speed. When struck by a runaway trolley wheel this guard arm is thrown violently upward against a stop block "D" forcing down the lock arm "B" which catches and automatically stops the trolley wheel. An oil cup "E" on top of the device provides constant lubrication. When the guard "A" is thrown upward by the racing trolley wheels on a broken chain it also engages the limit switch, thus shutting off the conveyor power.

Economy Semi-Automatic Pointing Machine

AN improved machine, the Economy Model P, for semi-automatic pointing of bolts, studs, or rods, ¼-¾ in. diameter and 5½ in. or more in length, is introduced by The Economy Engineering Co., Willoughby, Ohio. Except for inserting and removing the blanks, every movement is automatic. The piece is simply inserted against the stock gage where it is automatically gripped on the round; the stock gage moves aside, the pointing head moves forward automatically and finishes the point. The gripping jaws then open and the finished piece is exchanged for a new blank.



For adapting to different size bolts, it is necessary only to adjust the pointing head and gripping device, both of which are readily accessible. While recommended for work not exceeding ¾ in. in diameter this machine, on short runs, will handle 1 in. work equally well.

Floor space required is 23 x 34 in.; net weight 1400 lb. The motor is 1½ hp. at 1800 r.p.m.

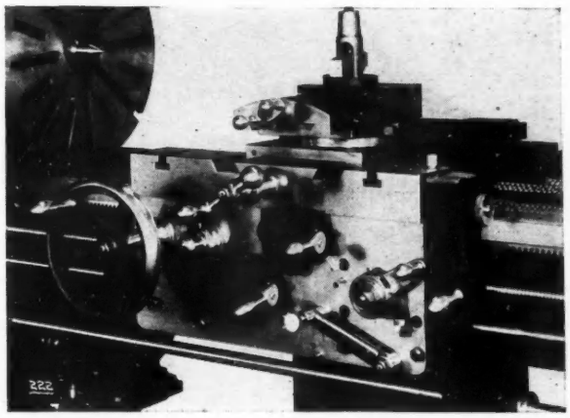
Cutler-Hammer Single Pole Limit Switch

THE functions of stopping, starting or reversing electric motors on machine tools, conveyors and similar applications are combined in the small single pole limit switch announced by Cutler-Hammer, Inc., Milwaukee, Wis. Two types are furnished: one with normally closed contacts which are opened when the operating roller is depressed, and the other with normally open contacts which are closed when the roller is depressed.

Bradford "Kant-Slip" Apron-Feed Mechanism

BRADFORD lathes ranging from 14-48 in. swing are now available with the new quick-acting "Kant-Slip" friction apron-feed mechanism recently developed by The Bradford Machine Tool Co., Cincinnati, Ohio. Some of the outstanding features of this element are as follows:

Positive disengaging as well as an engaging movement for a friction type feed mechanism. Smooth feed engagement and disengagement

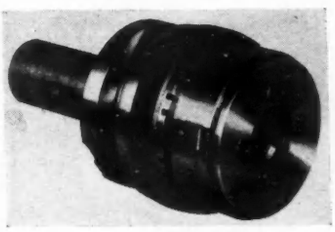


accomplished by a single partial stroke of a small lever; with the absence of jolts or jerks, and yet no uncertainty as to quick and powerful feed engagement and release. Absence of frequent adjustments since this mechanism automatically takes up its own wear.

No pressure is needed to keep the feeding mechanism engaged because the slight friction-engaging angles cause these parts to remain in permanent contact, once they are engaged. Moreover, the small eccentricity of the eccentric engaging shaft affects the automatic locking of these parts.

Rickert-Shafer Automatic Die-Head

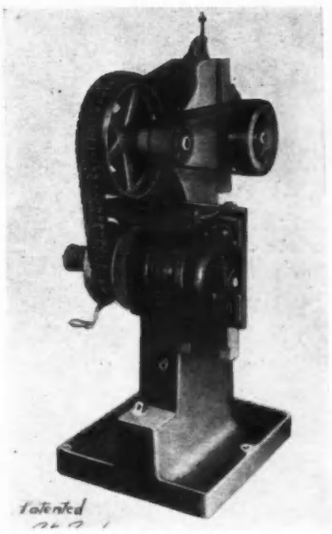
PROVIDING a range from 5/16-1½ in. diameter and 18-6 pitch, the Model C automatic self-opening die-head recently announced by The Rickert-Shafer Company, Erie, Pa., is said to embody a number of unusual features. First a tongue and groove joint is employed to hold the chasers against the chaser retainer. This direct method is said to promote positive action and accurate threads at all times. Again the chaser retainer is made in two pieces, to allow accurate grinding of angular surfaces. By means of deep notches on the adjusting ring and a pawl recessed into the chaser retainer, these two members are positively locked as an integral part. Another feature is that the chasers can be removed and replaced with ease by lifting the latch with thumb or index finger, causing the trip ring to spring back, carrying with it the chaser retainer. The chasers are then free to be withdrawn from the slots, permitting a change without breaking down the set-up.



Variable Speed Drive in Kent-Owens Millers

A NEW type variable speed drive which is said to provide an infinite number of spindle speeds over a wide range, heads the important improvements in their No. 1 and No. 2 heavy duty millers, according to a recent announcement by the Kent-Owens Machine Co., Toledo, Ohio.

The variable speed drive and its method of operation is shown in the accompanying illustration. The drive from the motor to the backshaft is through a combination flat and V-belt of heavy endless construction, made of woven cord vulcanized in rubber. This belt rides upon its angular edges between two cone disks upon the motor shaft and upon its inside face over a plain pulley upon the backshaft. The cone disks upon the motor shaft are continually pressed toward each other by a coil spring, thus forcing the belt to the greatest diameter. To change speeds the motor carrying the cone pulley upon its shaft is moved toward or away from the backshaft. As the motor approaches the backshaft and the center distance becomes less, the spring forces the V-belt toward the outer circumference of the cone which operates the spindle at a high speed. Similarly, moving the motor away from the backshaft causes the V-belt to ride upon a small diameter of the cone, thus decreasing the spindle speed. A spindle speed variation of 3 to 1 is obtained by this adjustment and this is increased to 10 to 1 by interchanging the pulleys on the spindle and backshaft.

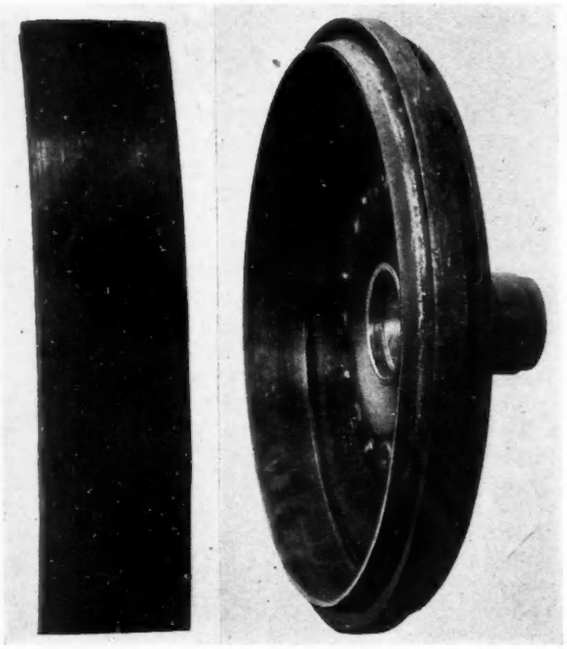


Speed changes are made directly at the front of the machine by simply turning the handle shown at the lower part of the guard. Turning this handle causes the motor slide to move toward and from the backshaft as above described.

The machine shown here is the No. 1; the construction of the No. 2 machine is similar except that an idler pulley has been added at the spindle drive belt. This type of drive will be available shortly on the No. 2 heavy duty combination manual and power feed machine.

Permanent Mold Cast-Iron Brake Drum is Developed by Holley

Weight of unit, including steel spider support, is only slightly greater than pressed-steel, integral-web type - - - - - -



The Holley brake drum (right) with section of lining after 5000 stops

THE Holley Permanent Mold Co., Detroit, Mich., is offering to the automotive industry a new brake drum structure which has been designed by E. A. Nelson and which is illustrated herewith. It is known as the Holley brake drum and consists of a ring supported at its center inside a stamped steel spider. The weight of this brake drum construction is said to be only little greater than that of the average pressed steel drum now in use.

One difficulty that has been encountered with the conventional type of brake drum with integral web is that it tends to become bell-shaped in service, owing to greater heat expansion on the open than on the closed side. This tends to cause the lining to wear more rapidly near the closed than near the open side, hence it will wear down to a wedge-shape. In the Holley brake drum this is obviated by supporting the ring centrally so that it will remain cylindrical and not take the form of a cone. It is claimed that this "conical condition" results in unequal wear of the brake lining, as well as in squealing, and a portion of the effort required to set the brakes is consumed in distorting the brake shoes. The Nelson construction is claimed to permit the brake bands to act with uniform pressure over the whole width of the drum.

We have been furnished by the manufacturers with the following results of tests which were made to establish the superiority of their construction over the standard steel drum. 5000 stops were made in a special brake testing machine, a weight of 800 lb. of metal being supported on the wheel, which latter was of 28 in. diameter and revolved at 720 r.p.m., which corresponds to a road speed of about 60 m.p.h. The wheel was brought to a stop every two minutes and was stopped in five seconds. After the test there was an average wear of 0.0034 in. on a 16-in. drum. The

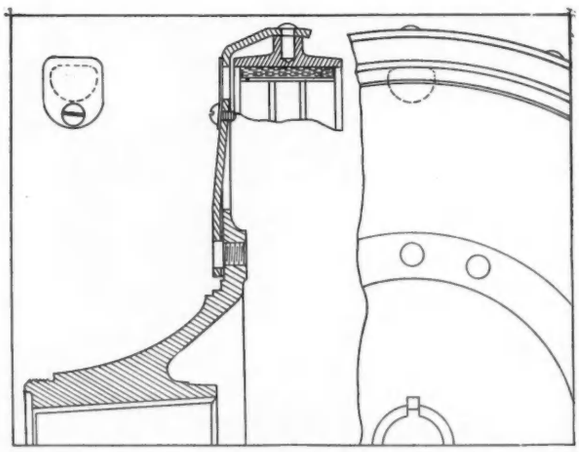


Fig. 1—Sectional and side view of wheel hub with Holley cast-iron brake drum

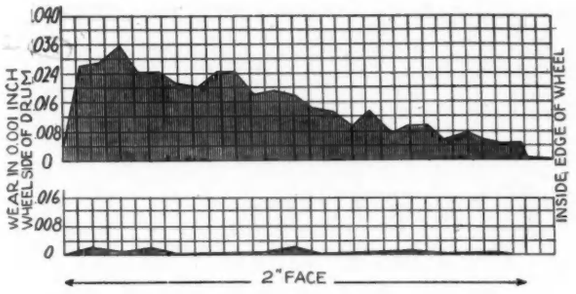


Fig. 2—Plot of wear of soft-steel drum after 2800 stops (above) and plot of wear of cast-iron drum after 5000 stops - - -

wear on the surface of the drum is plotted and may be compared with wear on an ordinary soft steel drum in Fig. 2. In the case of the steel drum, however, only 2800 stops were made. A molded brake lining was used in both cases.

Fig. 3 shows the Holley brake drum applied to a truck wheel. With this construction it was found that the drum could be allowed to reach a very high temperature without running risks of the tire rim becoming dangerously hot. This is of particular importance in connection with dual-tire wheels.

These brake drums are made by the Holley Permanent Mold casting process, and heat-treated. The metal resulting from this process is claimed to have about 30 per cent greater tensile strength, 50 per cent greater transverse strength, and about 70 per cent greater compression strength than the same iron cast in sand. The chief advantages claimed for this brake material are that the ring stays absolutely round when subjected to severe road conditions, owing to the fact that all internal strains are removed by the high temperature at which this iron is heat-treated, which is some 400-500 deg. Fahr. higher than the maximum at which ordinary cast iron can be heat-treated. It is further claimed for this iron that it has between 80 and 90 per cent greater resistance to impact than the same iron cast in sand.

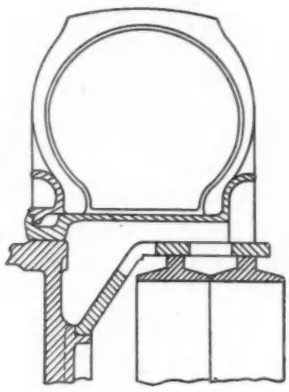


Fig. 3—Holley brake drum design for truck wheel

Wide Range of Fuels for High-Speed Diesels

THE impression prevails that small, high-speed Diesel engines are quite limited with respect to the grades of fuel they are capable of using. The Buda Co. of Harvey, Ill., in a circular on the subject of Diesel fuel oils for Buda-M.A.N. Diesel engines, points out that there is a wide range of fuel oils that can be successfully burned in these engines. The Baume gravity is not a definite criterion of the availability of the oil. In order that the fuel pump may at all times take in a complete charge of fuel oil it is advisable to have some pressure on the supply line, and the bottom of the fuel tank should be not less than 3 ft. above the top of the fuel pump.

The finest screen used in the Buda fuel filter is of 200 mesh, and the fuel must be able to flow through it when the atmospheric temperature is the lowest under which the engine is required to operate. Therefore, any fuel oil that will flow through the finest screen used and on into the pump uninterruptedly under all temperature conditions is satisfactory.

It is advisable to use the lower Baume fuel oils, as they possess better lubricating qualities, thereby reducing wear on the close-fitting parts of the fuel pump. Fuel oil of above 38 deg. Baume should never be used in a new engine and not for any great length of time in an old one, on account of its low lubricating value. Adherence to this rule will tend to prevent scoring of the pump plunger and valve guides.

In the accompanying table are given the results of analyses of three fuel oils which have been used successfully in the Buda-M.A.N. engine. No. 1 is a fuel oil sold by a prominent oil company and also used by it in its Diesel-engine-equipped tankers. No. 2 is a fuel oil commonly used in the industries in forging and heat-treating furnaces. No. 3 is a fuel oil commonly sold for residential heating plants.

Fuel Oils Used in Tests

	No. 1	No. 2	No. 3
Baume at 60° Fahr.	26 plus	34.3	38.2
Flash—Pensky-Martin closed cup test	200° Fahr.	225° Fahr.	160° Fahr.
Viscosity at 100° Fahr.	50 sec.	.....	.....
Carbon—Conradson test	2.57%	0.03%	0.006%
Pour test	0° Fahr.	.....	.....
Water and sediment	0.10%	0.10%	0.06%
B.t.u. per lb.	19239	19590	19675
Sulphur	0.78%	0.63%	0.31%

Automotive Oddities — By Pete Keenan

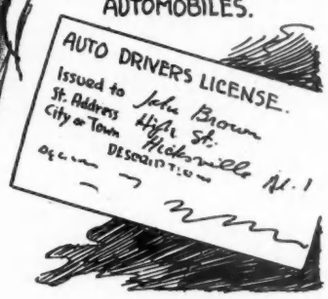
THIS CAR, BUILT IN 1899, CAN STILL DO 18 MILES AN HOUR WHEN FUELED WITH NAPHTHA. GASOLINE IS NOT VOLATILE ENOUGH TO DRIVE IT.
Milwaukee, 1930.

THE AUTO CLUB WITH THE LONGEST INITIALS.

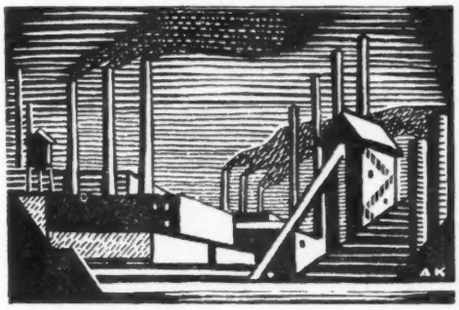
R·E·A·A·A·A·A

(ROYAL EAST AFRICAN AUTOMOBILE and AERONAUTIC ASSOCIATION.)

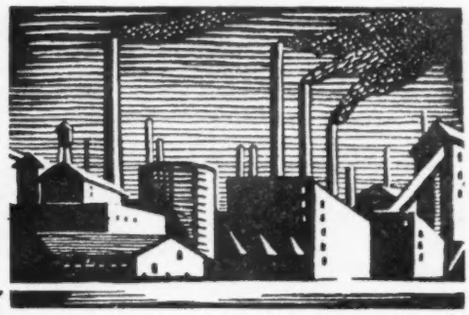
THERE ARE TWICE AS MANY DRIVERS IN THE U.S.A. AS THERE ARE AUTOMOBILES.



HARRY HUKING COMPLETED 10 YEARS OF FLYING WITHOUT INJURY TO MAIL OR PASSENGER.



NEWS OF THE INDUSTRY



To Certify Tests of Plane Behavior

A.C.C., Cooperating With Other Groups, to Furnish Field Data

NEW YORK, June 19—The Aeronautical Chamber of Commerce of America, Inc., in cooperation with the Department of Commerce and eight universities which are prepared to carry on the work, will make the first test of a commercial airplane under a new proposed code for certification of performance at Roosevelt Field Saturday. A Curtiss Robin equipped with the Challenger engine will be subjected to the tests which will enable the manufacturer to secure accurate data on performance for use in advertising and selling.

The new code provides for tests with calibrated instruments, of high speed, climb to 10,000 ft., ceiling, angle of initial climb, length of take-off, length of lading run, landing speed with power off, minimum speed with power on, and minimum speed with power off. It is anticipated that later on as controllability and stability tests are perfected they will also be undertaken.

After the tests have been made and any necessary changes incorporated, the following colleges and universities will be authorized to make the certification tests: New York University, University of Washington, Leland Stanford, University of Cincinnati, Iowa State College, California Institute of Technology, Purdue, University of Michigan.

Kissel to Continue Lines

MILWAUKEE, June 16—In a letter received by Milwaukee owners of Kissel automobiles, the Kissel Motor Car Co., Hartford, Wis., made its first statement relative to its recent association with New Era Motors, pointing out that Kissel will build Ruxton front-wheel drive cars, at the same time continuing its present line of Kissels.

Cords Win Beauty Prizes

AUBURN, IND., June 18—Five standard Cord Front Drive cars entered by owners in the beauty competition at Fahrkraft, Germany, won six of the prizes, Auburn-Cord distributors at Berlin have cabled the Auburn factory.

Dealers Use Radio to Sell Used Cars

CHICAGO, June 18—The Chicago Automobile Trade Association is using radio station WMAQ of the Chicago Daily News *to interest the public in used cars. The first broadcast was made in May and was directed at educating the public to the real value in used cars and urging them to purchase such cars from reliable dealers. "Unused Transportation in Motor Cars" is the general subject being dealt with and the inaugural broadcast was "The Birth of the Motor Car."*

British Plan New Airship

Reveal Cost of R-100

PHILADELPHIA, June 16—In a recent debate in the British House of Lords, the Minister for Air, Lord Thomson, intimated that the government planned to construct an airship of 7,500,000 cu. ft. capacity, subject to results from the projected trial flights of the R-100 and R-101.

Lord Thomson also revealed some figures relating to the cost of the two government airships R-100 and R-101, and expenditures of the government incidental to their construction. The sum spent on the construction of the two vessels was $4,340,000. A further sum of $1,480,000 was spent for research connected with the airship program of the government.

Fokker Change Approved

NEW YORK, June 18—Stockholders of Fokker Aircraft Co. of America, meeting today, formally approved the change of name of the company to General Aviation Corp. This change, which was recommended by the directors some weeks ago, was made in order that the company might become a holding company for a number of aviation interests including the Dornier Co. of America, which is owned jointly by Fokker and General Motors Corp.

A subsidiary will be formed to take over the manufacturing operations.

Traffic Managers Meet With Rail Men

Lower Freight Rates Approved On Parts Shipped With Cars

DETROIT, June 18—At the meeting of the traffic managers' committee of the National Automobile Chamber of Commerce here last week, M. J. Gormley, executive vice-president of the American Railway Association, expressed the belief that requests for freight cars equipped with special racks for shipments of automobile bodies and engines should be directed to railroads on which shipments originate. Mr. Gormley indicated doubt as to the advisability of railroads increasing the number of wide-door box cars for automobiles, stating that there are now some 200,000 of such in service and that many of these, built long ago, are no longer used for automobile shipments.

Lower freight rates on automobile parts packed with bodies for export, recently requested by the N.A.C.C., have been approved, it was reported. The classification committee made its report on hearings before railroad committees affecting the rates on various automobile parts and accessories. The study being made jointly by the railroads and the industry in the shipping of automobiles by rail, water, driveaway and truckaway was reported progressing.

Universal Distributing Suspends

ST. LOUIS, June 19—The Universal Motor Car Distributing Corp., which dealt in new automobiles at cut prices, has closed its operations as the result of an alleged shortage in the accounts of one of its officials. The Universal Corporation bought new cars from overstocked dealers, particularly in rural communities, and sold them to consumers at a discount. Purchases were financed by the Mississippi Valley Finance Co., an affiliated company.

Florida Names Bus Inspector

TALLAHASSEE, FLA., June 19—The motor transportation division, Florida Railroad Commission, has just announced the appointment of H. J. Stewart as inspector of motor buses and trucks.

Standards Engineer Sets Simple Taxation Formula

Would Enable States to Tax Vehicles Equitably

WASHINGTON, June 19—Charles F. Marvin, Jr., mechanical engineer of the U. S. Bureau of Standards, has worked out a simple method of distributing equitably the total motor-vehicle tax levy as determined by the states. Mr. Marvin's method apportions among the various classes of vehicles and among the units within a class tax payments corresponding as nearly as possible to the amount and character of the use of the public streets and highways by each vehicle. His system also includes a workable basis for levying fuel tax and registration fees. Results of his investigations are printed in the May issue of "Public Roads," the official research magazine of the Bureau of Public Roads, U. S. Department of Agriculture.

Mr. Marvin uses three formulas in which he substitutes certain values which have been arrived at after careful investigation of relative costs to the state resulting from operation of average vehicles of different gross weights and which allow for the relative economic and social desirability of the different weights of vehicles as units of transportation. The first formula is for the total of motor vehicle tax payments. Subtraction of the annual proceeds of the fuel tax gives the amount to be collected in registration fees.

According to the registration fee formula, the equation determines small fees for light cars, which are taxed equitably by the fuel tax alone, and is chiefly effective for the heavier trucks and buses for which the fuel tax is inadequate.

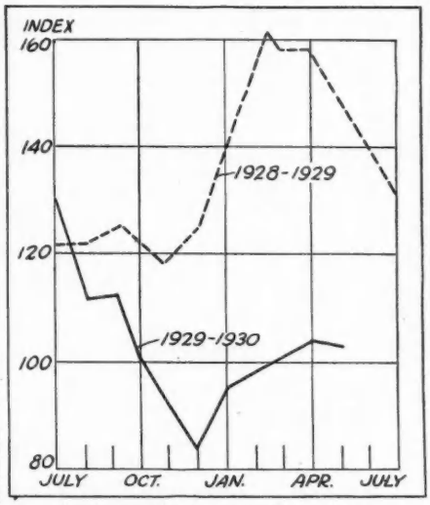
Taxes should also be imposed, Mr. Marvin says, so that they will penalize, wherever possible, those vehicles which are inefficient in their use of the highways or of the Nation's fuel resources. Each state must determine for itself how much it wishes to spend on highways and what percentage of this amount should be financed by motor vehicle taxes.

Wisconsin Sales Favorable

MILWAUKEE, June 16—New passenger cars to the number of 14,531 were sold and registered in the State of Wisconsin during May, according to official reports. In the same month of 1929, the registrations numbered 19,858, which constituted a new high record. In May, 1928, new car sales numbered 12,795, and in May, 1927, they were 13,387, so that the current year's figures compare favorably with normal years and in a normally expected growth.

New trucks registered in Wisconsin during May numbered 1371, compared with 2230 in May, 1929. The total for the first five months of this year is 6079, against 6677 in the same period of 1929.

Ohio Employment



Employment in the automobile and parts manufacturing plants in the state of Ohio during the period July, 1928-July, 1929, and July, 1929-May, 1930, is charted above. An actual decline of 1 per cent was registered in the May, 1930, Index as compared with the Index for April. Twenty-eight of the 49 reporting concerns shared the decrease, while 17 reported an increase in employment for May. Four showed no change

Buda to Close Plant

HARVEY, ILL., June 19—The Buda Co. has announced that its entire plant will be closed for inventory and summer vacations from July 28 to Aug. 9 inclusive. No shipments will be made from the plant during this period, except in the case of customer's emergency requirements.

Thompson Gets Bristol Order

CLEVELAND, June 19—Thompson Products, Inc., aeronautical division, announces receipt of an order for 2000 aircraft valves to be used in 100 Bristol Jupiter engines, being built by the E. W. Bliss Company of Brooklyn.

Honorary Committee Named for International Meeting

President and Cabinet to Serve With Highway Group

WASHINGTON, June 19—Heading the list of the honorary committee of the Sixth International Road Congress to be held in Washington, October 6 to 11, is the name of President Hoover, according to announcement today from the offices of the American Organizing Commission.

With the President as members of the honorary committee appear the names of his entire Cabinet, Secretary of State Henry L. Stimson; Secretary of the Treasury Andrew W. Mellon; Secretary of War Patrick J. Hurley; Attorney General William DeWitt Mitchell; Postmaster General Walter F. Brown; Secretary of the Navy Charles F. Adams; Secretary of the Interior Ray Lyman Wilbur; Secretary of Agriculture Arthur M. Hyde; Secretary of Commerce Robert P. Lamont, and Secretary of Labor James J. Davis.

Serving on the committee from the legislative branch of the government are Senator William E. Borah, chairman of the Foreign Relations Committee of the Senate; Senator Lawrence C. Phipps, chairman of the Committee on Post Offices and Post Roads; Representative Stephen G. Porter, chairman of the Committee on Foreign Affairs of the House; and Representative Cassius C. Dowell, chairman of the Committee on Roads of the House of Representatives.

Martin Drops Soviet Plans

BALTIMORE, June 17—The abandonment by the Glenn Martin Co. of plans to sell 20 twin-motored bombing airplanes to Russia became known when the U. S. government announced an embargo on exports of arms, munitions and military aircraft to the Soviet Union.

Rubber Invoiced to U. S.

WASHINGTON, June 17—American consular offices at Singapore, Penang, Colombo, Batavia, Surabaya, Medan, London and Liverpool, whose vise invoices on all rubber shipped to the United States from Malaya, Ceylon, Netherland East Indies, and the United Kingdom, report by cable the following amounts of rubber invoiced during the week ended June 14 as compared to amounts invoiced in 10 preceding weeks.

1930 Week Ended	British Malaya	Ceylon	Netherland East Indies	London and Liverpool	TOTAL
March 29	5,867	1,335	1,462	Nil	8,664
April 5	7,435	779	2,109	Nil	10,323
April 12	7,026	1,235	1,527	7	9,795
April 19	6,013	493	1,109	21	7,636
April 26	5,558	642	1,224	Nil	7,424
May 3	7,703	1,384	1,806	25	10,918
May 10	6,863	891	1,271	11	9,036
May 17	8,863	650	1,874	30	10,913
May 24	6,041	741	1,500	162	8,444
May 31	6,532	738	1,746	54	9,070
June 7	6,443	1,020	1,971	24	9,458
June 14	5,938	631	1,586	63	8,218

All figures in long tons.

Bids Asked on New Ford Plant in California

Expected to be in Production by June 1, 1931

RICHMOND, CALIF., June 19—Bids have been asked for on the huge assembling plant to be constructed here by the Ford Motor Company.

Fred D. Parr, of the Richmond Chamber of Commerce, has returned from a tour of the East and brought back with him a schedule of the Ford Company's planned movements regarding the factory.

The bids are expected to be analyzed and the contracts let by the middle of July. It is expected another month will be needed for the contractors to assemble their material and begin construction. Thus, it is believed, actual work on the plant will begin during August or at the latest by Sept. 1. It is planned to rush the work to completion in nine months, so that the factory will be running full blast by June 1 of next year.

Mr. Parr said he was authorized to make definite public announcement of these plans, as a result of his visit to the Ford head office at Dearborn.

It is expected this plant will turn out 400 cars a day, which is a one-third larger output than at the Long Beach plant.

Rubber Prices Are Low

NEW YORK, June 16—Crude rubber prices continue to reach new low records, last week having seen a price of 11.9 cents for July goods, according to F. R. Henderson Corp. On account of the continuing low price, there are persistent rumors afloat that there are possibilities of concerted action on the part of British and Dutch local governments in the producing areas. What form any such action may take is uncertain, outside the probability that some attempt may be made to limit production.

Stocks in London continue to increase, reaching 77,616 tons last week, while Liverpool stocks increased to 25,320 tons. Arrivals at all ports of the United States during the first 13 days of June are estimated at 12,600 tons, with the probable total for the month placed at 40,000 tons.

Moon Forms Subsidiary

ST. LOUIS, June 18—The Ruxton Corp., a subsidiary of the Moon Motor Car Co., has been organized as a sales and distributing corporation to handle the output of both Moon and Kissel plants. The headquarters of the Ruxton Corp. will be at the Moon plant in St. Louis.

Ford Chicago Branch Active

CHICAGO, June 16—Retail deliveries of Ford passenger and commercial cars by the Chicago branch of the Ford Motor Company up to May 20 were 13 per cent above those for the corresponding period of last year, according to officials of the company.

U. S. Produces Most Reclaimed Rubber

WASHINGTON, June 16—With production gaining 5 per cent and exports to 26 countries showing an increase of 23 per cent during the past year, the United States established even more firmly its position as the leading world producer and supplier of reclaimed rubber, according to Harry W. Newman, of the Commerce Department's Rubber Division.

Shaler Buys "Rislone" Rights

MILWAUKEE, June 16—Exclusive rights for the manufacture and sale of "Rislone," a product designed to be used with lubricating oil in the crankcase, have been purchased by the Shaler Co., Milwaukee and Waupun. Captain Dalton Risley, Jr., Philadelphia, originator of the product, will be in charge of Shaler activities in connection with its production and merchandising. The product will now be known as "Shaler-Rislone" and will be supplied to the eastern trade from a Philadelphia plant, and to the western trade from the Shaler Milwaukee plant. Establishment of an additional far-western plant is contemplated. Added to the crankcase oil, the product is claimed to permit of immediate operation at full speed of a new engine to improve operating characteristics of older engines, and to make winter starting easier.

Elmer A. Sperry

NEW YORK, June 17—Elmer A. Sperry, a well-known engineer who was connected with the automobile industry during its early years, died in New York on June 16, aged 70. Mr. Sperry was a pioneer in the electrical industry and in 1899 developed an electric vehicle to which the rights were acquired by the Cleveland Machine Screw Co., Cleveland, Ohio. He was best known through his work on the gyroscopic compass and other instruments for use on board ship. During recent years he had been engaged on the development of a light Diesel engine for use on aircraft in which the gases of combustion were expanded in two cylinders successively. In 1929 he was president of the American Society of Mechanical Engineers.

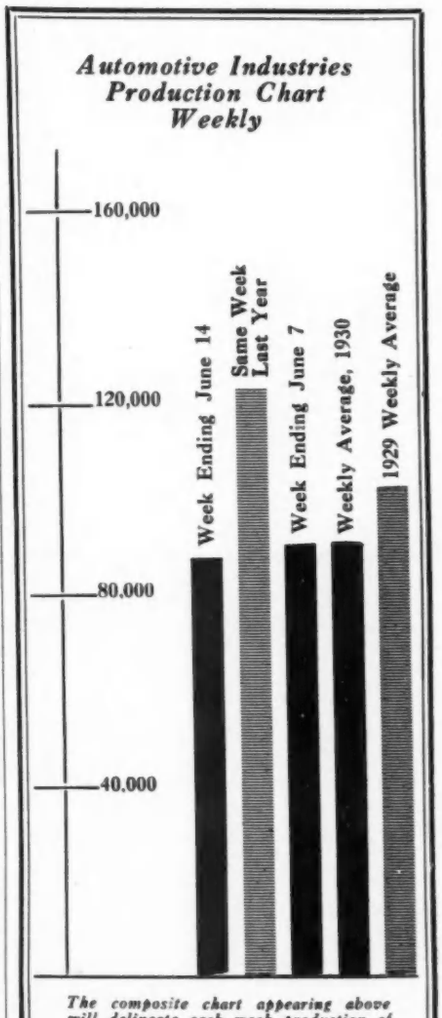
Refrigerator Body Introduced

EVANSVILLE, IND., June 14—Hercules Products, Inc., commercial car body building plant, has introduced a new model in the Hercules refrigerator car body designed for transportation of perishable foodstuffs, and which is being received with orders from large meat packing industries, according to Hercules officials. The new model consists of driver's compartment, refrigerator compartment and general purpose compartment. The refrigerator compartment for perishable foods is equipped to maintain an average temperature of 40 to 55 deg.

Opel Plans Discussed at Press Conference

Will Concentrate on Three Models in Future

PHILADELPHIA, June 17—At a recent press conference, given by Eduard Winter, General Motors distributor in Berlin, who had just taken on the sales representation for Opel cars, plans for future Opel production were discussed. It was announced that the Russelsheim firm in future would produce three models: a seven-passenger 183 cu. in. car, a 122 cu. in. car and a long-expected popular-priced car. The larger model is to be ready for public showing at the time of the Berlin show next fall; the second model by the end of the year, and the low-priced model in about a year. A careful analysis of market conditions is said to have led to the conclusion that within five years the production of the Opel Works will have reached 300,000 annually.



The composite chart appearing above will delineate each week production of passenger cars in the United States and Canada, for the week preceding publication of the issue in which it appears, together with production for the preceding week, and other factors. Data used in compiling it are obtained in confidence from a number of sources. Other factors may be added, dependent upon the cooperation of additional sources of information.

Men of the Industry and What They Are Doing

A.S.M.E. Nominates Officers at Semi-Annual Meeting

The nominating committee of American Society of Mechanical Engineers at the semi-annual meeting in Detroit, nominated the following officers of the society for 1931:

For president, Roy V. Wright, managing editor of *Railway Age.*

For vice-presidents, Wm. A. Hanley, chief engineer Eli Lilly & Co., Indianapolis; Thos. R. Weymouth, president Oklahoma Natural Gas Corp., Tulsa; Dr. Harvey N. Davis, president, Stevens Institute of Technology, Hoboken.

For managers, W. L. Batt, president, SKF Industries; H. L. Doolittle, chief designing engineer, Southern California Edison Co.; H. L. Whittemore, chief engineer Mechanics Section, Bureau of Standards.

For representatives on the American Engineering Council, the committee nominated the following: W. R. Webster, vice-president Bridgeport Brass Co.; Roy V. Wright, managing editor of *Railway Age;* J. W. Roe, professor Industrial Engineering, New York University; D. Robert Yarnall, vice-president, Yarnall Waring Co., Philadelphia; E. N. Trump, consulting engineer, Solvay Process Co.; B. E. Hull, president Texas Pipeline Co., Houston; E. O. Eastwood, professor Mechanical Engineering, University of Washington; W. Trinks, professor, Mechanical Engineering, Carnegie Institute of Technology; Warner Seely, secretary, Warner & Swasey Co., Cleveland; William S. Conant, consulting engineer, Washington, D. C.

Campbell Inspecting Branches

W. R. Campbell, president of the Ford Motor Co. of Canada, Ltd., and J. J. Quinn of the company's sales department, took off this week from Walkerville on a 12-day airplane trip for an inspection of Ford branches in the Canadian northwest.

Brandt Appoints Linabury

John E. Linabury has been appointed manager of the foundry engineering division of A. J. Brandt, Inc. of Detroit. Mr. Linabury has been connected with General Motors for the past 10 years as general foundry consultant.

Easton-Martin to Visit U. S.

S. A. Easton-Martin, secretary of the South Africa Motors Traders Association, is leaving South Africa, and will arrive in New York early in August for a two months' visit and business trip.

G.M. Names McGilvray

Albert E. McGilvray has been appointed manager of the Customs and Drawback department of General Motors of Canada, Ltd. His headquarters will be at Oshawa, Ont.

Promoted

Ross Mackinnon

whose appointment as assistant general sales manager of General Motors Corp., of Canada, Ltd., was announced in AUTOMOTIVE INDUSTRIES *last week*

Renault is Honored

Louis Renault, founder and president of the Societe Anonyme des Usines Renault, has recently been named to sit with the Council of the Legion of Honor of France, by President Doumergue. Mr. Renault is the first industrialist to have been granted this honor since the foundation of the Legion. Membership in the Council was formerly limited to ten, but a recent government decree has raised the number to fourteen.

Forsythe is Transferred

William R. Forsythe, comptroller of the Armstrong Spring Co., a division of General Motors Corp., has been transferred to Jaxon Steel Products, Jackson, Mich., another division of General Motors Corp. in the capacity of secretary-treasurer.

Husson Joins Vacuum Oil

Joseph Husson, former president of the Eleto Co., New York, and a former editor of the old *Commercial Vehicle,* has joined the Vacuum Oil Co., New York, as transportation engineer, with its warehousing and distributing committee.

Issues Parachute Regulations

WASHINGTON, June 20—Regulations, providing for the issuance by the Department of Commerce of certificates of approval for parachutes were announced today by Clarence M. Young, assistant secretary of commerce for aeronautics.

McPherson is Appointed to Standards Bureau Post

WASHINGTON, June 19—Dr. Archibald T. McPherson, Marceline, Mo., has been appointed chief of the rubber section of the organic and fibrous materials, Bureau of Standards. He will direct the section formerly headed by P. L. Wormeley, who will be placed in charge of the new section of specifications and testing. The change will become effective July 1.

Dr. McPherson was appointed assistant chemist at the bureau in January, 1918, but has only served continuously since 1923. Since that time he has been connected with the electrical division and has specialized on research covering the electrical properties of rubber.

Oakland Names Burt

A. J. Burt, formerly assistant zone manager for the Oakland Motor Car Co., has been appointed zone manager for the Chicago district, H. E. Mahaffey, western division sales manager, has announced.

Mr. Burt is not new to the Chicago or Mid-West trade, having been here until two years ago when he went to Milwaukee as zone manager. He has been associated with the Oakland company for 14 years.

Named to Committee

Lammot du Pont, chairman of the branch manager to succeed A. G. South-Carl L. Johnson, president, Gisholt Machine Co., Madison, Wis.; P. W. Litchfield, president, Goodyear Tire & Rubber Co., Akron, and Floris Nagelvoort, president, Nagelvoort-Stearns Cadillac Co., Seattle, have been invited to serve on the Committee on Manufacture of the Chamber of Commerce of the U. S. A.

Buick Appoints de Loach

Arthur E. de Loach, formerly assistant branch manager for the Buick Motor Co. in New York, has been appointed branch manager to succeed A. G. Southworth, who resigned early this year. Mr. Southworth is now president of the Glidden Buick Corp., which recently took over the entire retail division of the New York branch.

Schreiber Sails for Europe

G. A. Schreiber, consulting engineer, Detroit, well known in automotive production circles since his original association with the old E M F Company, sailed for Europe on June 18, where he will visit 20 countries on matter relating to patents and production for both his Detroit and foreign clients. Mr. Schreiber will return early next year.

General Motors' Sales Drop 8 Per Cent in May

Figure Includes Deliveries to United States Consumers

NEW YORK, June 18—During the month of May, General Motors dealers in the United States delivered to consumers 131,817 cars, according to an announcement made today by Alfred P. Sloan, Jr., president. This compares with 142,004 in the month of April and with 169,034 in May, 1929. Sales by General Motors manufacturing divisions to dealers in the United States amounted to 136,169 cars, as compared with 132,365 in April and as compared further with 175,873 in May, 1929.

Total sales to dealers, including Canadian sales and overseas shipments amounted to 147,483 cars, or over 6200 cars per day, as compared with 150,661 in April and as compared further with 220,277 in May, 1929.

The following table shows sales to consumers of General Motors cars in Continental United States, sales by the manufacturing divisions of General Motors to their dealers in Continental United States, and total sales to dealers, including Canadian sales and overseas shipments:

These figures include sales of Chevrolet, Pontiac, Olds, Marquette, Oakland, Viking, Buick, LaSalle and Cadillac passenger cars and trucks. Domestic sales in May were about 8 per cent less than April.

New Vacation Rule Adopted by Hudson

DETROIT, June 16—The Hudson Motor Car Co., adopting a new annual policy, will concentrate all vacations of employees within a two weeks' period. This year the period is from Saturday, June 28, to Monday, July 14. All departments will be on vacation during that period except a small force which will remain to take care of urgent matters.

To Report Road Progress

WASHINGTON, June 19—Statistics dealing with road building throughout the United States are included in a report soon to be made public by the Committee on Recent Economic Changes. It will be published by the National Bureau of Economic Research and gives a comprehensive analysis of the public construction situation in the United States. The report is based on a survey begun in July, 1929, at the suggestion of President Hoover.

Ruxton in Production

ST. LOUIS, June 16—The first Ruxton to be built entirely in the factory of the Moon Motor Car Co. here came off the assembly line last Monday and production will be speeded up gradually. Dealer shipments started during the week. The initial models are a roadster, sport touring car, five-passenger sedan and a cabriolet.

Dullness in Steel Marts Brings Out Price Shading

Hope of Business Revival Deferred to Fourth Quarter

NEW YORK, June 19—The steel market has become reconciled to the outlook for a typically dull summer. Up to a few weeks ago, hopes were entertained more or less generally that something would happen to even up the score of light demand during the spring, but the lull that has set in has caused hopes of a revival of activity to be deferred until fourth-quarter demand makes itself felt.

Meanwhile competition for what business the Detroit market affords continues keen. It has been suggested that Detroit be added as a basing point to Pittsburgh, Cleveland, Youngstown, Chicago, etc., so as to isolate the highly competitive prices that apply to some of the Detroit transactions. This suggestion has led to the comment that Detroit is not so much of a basing as an "unbasing" point.

One hears of some buyers having been able to get a $1 @ $2 per ton cut under the prevailing 2.55 cents, Pittsburgh, quotation on black sheets, and further shading in the price of full-finished automobile sheets is also reported. Producers of cold-finished steel bars are reported to have opened third-quarter books at the unchanged price of 2.10 cents. The market for their hot-rolled material is none too firm, and occasionally some very low prices are heard.

The strip steel market is dull, cold-rolled going mostly at 2.45 cents, Pittsburgh, even in relatively small lots. Semi-finished steel descriptions are definitely down to $31. The market for automotive alloy steels is fairly steady with fresh commitments on the downtrend. Third-quarter contracts for bolts and nuts are on the second-quarter basis, demand being of light routine proportions.

Pig Iron—Quite a little 100-ton lot business is being done with automotive foundries which estimated their second-quarter needs short of what they turned out to be, and are now filling in to tide them over. The Michigan quotation remains at $19. The Chicago market is unsettled, due to stiff competition of blast furnaces in different sections of the Middle West.

Aluminum—This metal is one of the few commodities which will come in under lower duty rates than heretofore, the rate on crude, scrap, and alloys being lowered from 5 cents to 4 cents per lb. and on plates, sheets, bars, strips, rods, and coils from 9 cents to 7 cents per lb. No change in the competitive situation, however, is looked for as the result of these changes. Automotive demand is extraordinarily quiet.

Copper—All producers met the custom smelters' cut to 12 cents per lb. at the opening of the week. That the decline was entirely unexpected by consumers is shown by their having covered their second quarter requirements at 13 cents, some having even contracted for deliveries during the fourth quarter. Additional buying will, therefore, consist largely of efforts to average cost on a lower basis.

Berliner-N.A. Merger Approved

CHICAGO, June 16—Acquisition of the Berliner-Joyce Aircraft Corp. by North American Aviation, Inc., has been approved by directors of the former company.

GENERAL MOTORS SALES

	United States				Total Sales to Dealers Including Canadian Sales and Overseas Shipments	
	Sales to Consumers		Sales to Dealers			
	1930	1929	1930	1929	1930	1929
Jan.	74,167	73,989	94,458	95,441	106,509	127,580
Feb.	88,742	110,148	110,904	141,222	126,196	175,148
Mar.	123,781	166,942	118,081	176,510	135,930	220,391
Apr.	142,004	173,201	132,365	176,634	150,661	227,718
May	131,817	169,034	136,169	175,873	147,483	220,277

Michigan Employment Drops

DETROIT, June 16—In the automobile industry in the State of Michigan as of May 15, there were 235,163 employees, an increase of 31,118 over the total of 204,045 for December, according to a report by the State Department of Labor and Industry, based on reports of 52 companies.

The aggregate weekly pay-roll for the automobile industry in the state was $7,985,873 as compared with $8,124,411 in April and $5,312,689 in December. Average weekly earnings per capita in the automobile industry were $33.95 in May, $35.07 in April and $26.03 in December.

American Refurnishing Plant

DETROIT, June 16—The plant at Port Huron, Mich., which will be occupied by the American Enamelled Magnet Wire Co., is now in the process of being reconditioned and it is expected that the installation of manufacturing machinery will be started within 30 days. The wire company, which is moving to Port Huron from Muskegon, Mich., is owned by the Electric Auto-Lite Co. and is moving to the plant formerly occupied by the Port Huron Engine and Thresher Co.

Ford Buys Chicago Dock Rights

CHICAGO, June 16—Prediction that Ford automobiles would be shipped from Detroit to Chicago by water was being made here following the announcement of plans of the Ford company to construct a dock 750 ft. long in the Calumet River in front of its property on Torrence Avenue south of 130th St. Completion of the dock is scheduled for early next winter.

V-16's to Tour Europe

DETROIT, June 16—A caravan of five Cadillac V-16 cars will tour the British Isles and Europe from June 21 to Sept. 30 to afford motorists in every large city in Europe an opportunity to inspect this model, it is announced. The caravan will be in charge of T. W. Henderson, manager of Cadillac-LaSalle sales for General Motors Export Co.

Gain in Construction Projects is Reported

Automotive Plant Additions and Tool Sales Increase

PHILADELPHIA, June 19—Factory addition and construction projects, as well as machine tool sales, showed a slight increase over last week, according to reports received this week by *Automotive Industries.*

The slump noted during this month in Chicago seems to have given way to an upturn. An number of important inquiries have been received by tool manufacturers in that territory. Among the announcements made this week were:

W. C. Sommerfield, New York architect, plans $175,000 repair and service garage.

J. C. Van Vlandren, Paterson, N. J., will soon take bids on $140,000 repair and storage garage.

New Haven, Conn., Municipal Airport Commission has plans nearing completion for new airport, including engine reconditioning shops, etc. Project to cost $300,000.

Overcashier Aircraft Mfg. Co., Detroit, plans expenditure of approximately $125,000 for additional manufacturing facilities and equipment.

Wilcox-Rich Corp. plans $75,000 building, with equipment, to increase manufacturing facility for automobile valves, etc. Cowles & Mutcheller, architects.

Fisher Body Co., Cleveland, Division of General Motors, approved plans for $300,000 die-stamping addition.

LaPlante-Choate Mfg. Co. (automobile and truck bodies) plans $60,000 manufacturing addition.

Smith Motor Coach Co., Memphis, Tenn., has asked bids on contract for $100,000 for plant for manufacturing motor bus bodies.

Shreveport, La., city council authorized $100,000 airport project, including engine reconditioning shops, etc.

Perfect Circle Co., Hagerstown, Md., plans expenditure of $75,000 addition to manufacturing plant.

Overseas Club Hears Kofman

NEW YORK, June 16—A. Kofman, head of the automotive division of the Amtorg Trading Corp., official purchasing organization for the Union of Socialist Soviet Republics in United States, addressed the Overseas Automotive Club last Thursday at its closing meeting for the season. Mr. Kofman outlined the automotive part of the five-year industrialization plan of the U. S. S. R. and its place in the larger plan. Following Mr. Kofman, Lloyd Taylor of the Sparks-Withington Co. gave a lighter talk choosing as his subject "Music," and entertaining the members with his wit and humor.

General Rubber Elects Jones

NEW YORK, June 18—General Rubber Co. has announced the election of Arthur Jones, of London, as president. E. C. Schwab has been re-elected vice-president and appointed manager of the New York office.

Mr. Jones has been associated with the company since 1907, and since 1927 has been managing director of General Rubber Co., Ltd., of London.

Opens New Test Centers

NEW YORK, June 18—New laboratories in its national system of testing and research have been opened at Kansas City, Mo., and Tulsa, Okla., by the Ethyl Gasoline Corp.

Death Wins

Sir Henry Segrave

British sportsman and holder of the world's land speed record who was killed while attempting to better the world's speedboat record which he set up a few moments previously

International Air Show Planned for Sweden

WASHINGTON, June 16—An international aeronautical exhibition will be held at Stockholm, Sweden, Sept. 6-28, under the auspices of the Royal Swedish Institute for Scientific Research and the Royal Swedish Aero Club, according to a report received in the Department of Commerce from Trade Commissioner F. C. Sommer, Stockholm. Exhibiting companies will have opportunities to demonstrate their planes with actual flights at the airport. Flying delegations will be present from England, France, Italy, Norway, Denmark and Czechoslovakia.

Buick Delivers 15,603

DETROIT, June 16—C. W. Churchhill, general sales manager of the Buick Motor Co., has announced that retail deliveries of Buick-Marquette units in May totaled 15,603 against 13,483 in May last year, an increase of 2120.

"Naturally we are highly pleased with these figures," said Mr. Churchhill. "When compared with the fact that Buick is now selling 30.1 per cent of its price class, which includes 15 makes of cars, against 24.6 per cent a year ago, they prove a remarkable index as to Buick's popularity in a market where values are scrutinized more carefully than ever before."

Sets Limit on Contract

DETROIT, June 18—The Detroit Aircraft Corp. expects to complete its contracts with the navy to manufacture 32 fighting planes within one year according to James Work, vice-president.

Segrave Dies Making New Speedboat Record

Catapulted From Craft and Fatally Injured During Run

LONDON, June 13—A few moments after he had shattered the world's record for speedboats, Sir Henry Segrave was catapulted from his boat, the Miss England II, and suffered injuries from which he died a short time later. At the time of the fatal accident Sir Henry's craft was hurtling through the water at a speed which was officially timed at 101.11 m.p.h. The mechanic riding, Michael Willcocks, was taken from the water with severe internal injuries and the engineer, A. V. Halliwell, of the Rolls-Royce Works, Derby, was drowned. The exact cause of the accident is not known.

Major Sir Henry O'Neal Dehane Segrave was knighted by King George V of England, after he had set the world's land speed record of 231.36246 m.p.h. in his Napier "Golden Arrow" at Daytona Beach, in 1929.

After this achievement he returned to America with a speedboat, the Miss England, with which he won the International Speedboat Trophy from Gar Wood, whose craft, the Miss America VII, was forced out of the contest by a broken steering quadrant.

The Miss England II was constructed at a cost of $125,000 for the express purpose of lowering the world's speed mark for motorboats. It was designed by F. Cooper, and built by Saunders-Rowe, Ltd., Cowes, England. Equipped with two Rolls-Royce engines of 2000 hp., similar to those mounted in the S-6 seaplane which holds the world's air speed record, the craft showed considerable difficulty of handling during its preliminary trials. The terrific power output caused the propeller to burst on several occasions, and the engines showed a tendency to overheat because of the difficulty of passing enough cooling fluid through them.

At the time of Sir Henry's death he was the holder of the world's speed records on land and water. It was generally considered among those close to him that he planned an attack on the air record as soon as a suitable plane could be built for him.

Fisk Concentrating Output

CHICOPEE FALLS, MASS., June 16—Production of automobile tires by Fisk Rubber Co. is being concentrated here. Operations of that department of the Cudahy (Wis.) plant are being transferred to this city, leaving only bicycle tires and miscellaneous rubber items to be made in Cudahy. With the exception of molds, no equipment will be moved. Machinery in the plant here has been improved to the point where it is in a position to meet fully the production requirements, officials say. Employment here is being curtailed.

Arnold Wins at Altoona; Leads Championship Race

Young Chicagoan Adds to Indianapolis Speed Laurels

ALTOONA, PA., June 16—Splintering the Tipton boards at an average of 111.5 m.p.h., Billy Arnold, winner of the 500-mile Memorial Day event at Indianapolis, won the 200-mile Flag Day Race here Saturday, and added 240 points to his standing in the A.A.A. championship rating.

Arnold's Miller-Hartz Special, the same car he used at Indianapolis, was number one in the front rank in the starting lineup at Tipton. Roaring ahead of the field of 16 cars, Arnold held the lead from the beginning and did not lose it at any time during the race, which lasted 1 hr. 47 min., 56.4 sec.

During the first 160 miles Babe Stapp of Los Angeles, mounting a Duesenberg Special, threatened Arnold's lead continuously, keeping from three-quarters to one and a half laps behind the speeding Miller. A broken oil line forced Stapp into the pits for the remainder of the race.

Mechanical casualties forced eight other cars out of the race, leaving seven to finish. Deacon Litz, DuBois, Pa., was second over the line at the end, with Frank Farmer, Philadelphia, third. Litz's average speed was 111.1 m.p.h., and Farmer's about 110.0 m.p.h.

Fred Winnai, Philadelphia, and his mechanic, Clyde Terry, Indianapolis, were seriously burned when their car broke a fuel line and sprayed flaming gasoline through the tonneau. Winnai got his car under control without endangering the safety of other contestants.

Making Springs in Finland

WASHINGTON, June 16—One of Finland's oldest metal works has enlarged its spring factory to include the manufacture of automobile springs, the Automotive Division, Department of Commerce, is advised by Consul J. R. Wilkinson, Helsingfors.

This Finnish company is now said to be in a position to fill the whole domestic demand for automobile springs and to produce for export besides. It has already exported considerable quantities of other kinds of springs to Switzerland, Sweden and Norway.

Piston Ring Sales Gain

DETROIT, June 14—A steadily continuing increase in the replacement sales of piston rings is reported by the Superior Piston Ring Co. of Detroit. The first quarter showed an increase of 42 per cent as compared with the first quarter of 1929. April business was 48 per cent over April of last year and May showed an increase of 58 per cent over the previous May. The company is maintaining its policy of not consigning stock, shipping only on 30 to 60 day billing.

111.5 M. P. H.

Billy Arnold

winner of the 500-mile Memorial Day race at Indianapolis who won the 200-mile championship event at the Tipton (Altoona) board oval on June 14, virtually clinching the three-A championship for this year

Goodrich Plans Partial Tire Plant Closing

AKRON, OHIO, June 17—Tire departments of the B. F. Goodrich Co. will close down on June 28 and will reopen on July 7, officials of the company announced Tuesday. The annual inventory of stock will be taken while the tire departments are not operating. Footwear department of the factory will close later for inventory, officials said, but the date of this period has not been fixed; other departments of the factory will continue to operate without change.

Durant May Shipments Gain

DETROIT, June 16—May shipments from the plants of Durant Motors, Inc., in Lansing, Mich., Oakland, Calif., and Leaside, Ont., this year exceeded the April output by 4.33 per cent, according to R. T. Hodgkins, general sales manager of Durant Motors. Last year Durant May production was 12.5 per cent below April. Total stocks of new cars and trucks in hands of Durant distributors and dealers throughout the country were less on May 31 than on April 30, Mr. Hodgkins said.

Durant Reduces Coach Price

DETROIT, June 16—R. T. Hodgkins, general sales manager Durant Motors, Inc., announced today that orders for the new four-door coach model of the company have been received in such volume that the list price has been reduced from $750 to $725.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, June 18—Retail trade last week was retarded by the unfavorable weather. Wholesale and jobbing lines continued unsatisfactory. Buying was cautious, and the turnover was slow. Some lines of business showed improvement.

DEPARTMENT STORE SALES

Department store sales during May, according to a preliminary report of the Federal Reserve System, were approximately equal to those in the corresponding month last year. Sales during the first five months of this year were 3 per cent below those in the corresponding period last year.

CHAIN STORE SALES

Sales of 32 store chains during May were 3.95 per cent above those a year ago, while sales of these same store chains during the first five months of this year were 3.36 per cent above those in the corresponding period last year.

CONSTRUCTION AWARDS

Construction contracts awarded in 37 Eastern States during May, according to the F. W. Dodge Corp. amounted to $457,416,000, which marks a decline of 5 per cent below those in the preceding month and a decline of 22 per cent below those in the corresponding month last year.

COTTON CLOTH OUTPUT

Production of standard cotton cloth during May, according to the Association of Cotton Textile Merchants of New York, amounted to 275,801,000 yards. Shipments during that month were equivalent to 97.9 per cent of production and sales to 66.9 per cent.

CAR LOADINGS

Railway freight loadings for the week ended May 31 totaled 860,249 cars, which marks a decrease of 112,576 cars below those a year ago and a decrease of 74,424 cars below those two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended June 14 stood at 87.0, as against 87.6 the week before and 87.8 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended June 11 were 10 per cent. below those in the corresponding week last year.

STOCK MARKET

There was another bad break in the stock market last week. Despite the fact that rallies from time to time had a steadying influence, prices fell from day to day. The heavy selling is attributed to the absence of any definite indications of business recovery. The volume of transactions was on an increased scale. Practically all issues closed the week with net losses. Call money ranged from 2½ to 3 per cent.

BROKERS' LOANS

Brokers' loans in New York City for the week ended June 11 decreased $103,000,000, reflecting the large-scale liquidation. This decline in brokers' loans is mostly the result of a reduction in loans made by reporting member banks in New York City for their own account.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended June 11 showed decreases of $30,000,000 in holdings of discounted bills and of $41,000,000 in holdings of bills bought in the open market. Holdings of Government securities increased $35,000,000. The reserve ratio on June 11 was 83.0 per cent, as against 82.2 per cent a week earlier and 82.9 per cent two weeks earlier.

Studebaker Corp. Reports Better Sales Conditions

Deliveries and Dealer Stocks Improved, Says Erskine

SOUTH BEND, June 17—"Studebaker dealers delivered more new Studebaker cars to retail purchasers in May than in any month since September, 1929," A. R. Erskine, president, stated today.

"May deliveries to consumers in the United States were only 24 per cent below deliveries of May last year, and those of the last 10 days of May were only 18 per cent less, while deliveries for the first four months of the year were 34 per cent below last year. The corporation's May sales exceeded production by more than 1000 cars, reducing its stocks of new cars on hand June 1 to 4528 cars, as compared with 7130 last year," he said.

Blees Sees Upswing

MINNEAPOLIS, June 14—Speaking before 150 dealers, Vice-President W. A. Blees, Oakland Motor Car Co., said he would rather invest in the automobile business now than at any other time in the last five years, prices being at rock bottom. Mr. Blees estimates that with a materialization of present crop prospects in the Northwest business in this section will start up by September and continue. He made the encouraging observation that the Middle West will be the first to return to normal business conditions.

Cadillac Ships 2000th V-16

DETROIT, June 16—Cadillac Motor Car Co. today shipped the 2000th V-16, according to President Lawrence P. Fisher. This car marks the achievement since January of an approximate dollar volume of $13,500,000 on the 16-cylinder Cadillac alone and represents a unit volume far in excess of company expectations.

Standards Year Book Published

NEW YORK, June 16—The American Standards Year Book, 1930, official organ of the American Standards Association, 29 W. 39th St., N. Y., was released for distribution today. This book covers the progress of standardization during the past year and lists in detail the national standards for various industries.

Advertise New Ford Truck

DETROIT, June 16—A new Ford Model AA truck is being advertised throughout the country. Among chassis changes are a spiral bevel gear rear axle, four-speed transmission, heavier front axle and spring, larger brakes and a power take-off opening.

U. S. Rubber Reduces Prices

DETROIT, June 16—In line with the move of other tire manufacturers the United States Rubber Co. has reduced its tire prices.

+ + CALENDAR + + OF COMING EVENTS

SHOWS

Bordeaux, France, Bordeaux Fair, June 15-30
Posen, Poland, International Transport and Touring Exposition. June 29-July 13
Lwow, Poland, Sample Fair ..... September
London, England, Olympia Show... October
Berlin, International Automobile.. Nov. 6-16

CONVENTIONS

World Power Conference, Berlin. June 16-25
American Railway Association, San Francisco ..... June 23-26
American Society for Testing Materials, Annual Meeting, Atlantic City ..... June 23-27
Steel Founders Soc. (Midsummer Convention) White Sulphur Springs, June 26-28
American Electroplaters' Society, Annual Meeting, Washington, D. C., June 30-July 3
Manufacturers' Aircraft Association, New York ..... July 1
Society of Automotive Engineers, Aeronautical, Chicago ..... Aug. 26-28
Eastern States Exposition, Springfield, Mass. ..... Sept. 14-20
National Safety Council, Annual Safety Congress, Pittsburgh.... Sept. 29-Oct. 4
Sixth International Road Congress, Washington, D. C. ..... Oct. 6-11
Exhibition—American Roadbuilders Association, Washington, D. C.... Oct. 6-11
Society of Automotive Engineers, Production, Book-Cadillac Hotel, Detroit ..... Oct. 7-8
Society of Automotive Engineers, Transportation, Pittsburgh ..... Oct. 22-24
Motor and Equipment Association, Convention, Cleveland ..... Nov. 10-14
N. S. P. A. Convention, Cleveland, Ohio, Nov. 17-21

SALONS

Chicago, Drake Hotel ..... Nov. 8-15
New York, Commodore Hotel. Nov. 30-Dec. 6
Paris, France ..... Oct. 2-12
Prague, Czechoslovakia ..... October
Paris, France, Salon (Commercial Vehicles) ..... Nov. 13-23
Brussels, Belgium, Salon ..... Dec. 6-17

RACES

Belgium ..... July 5-6
Germany (Grand Prix) ..... July 13
Belgium (European Grand Prix).... July 20
Spain ..... July 27
Italy (Grand Prix) ..... Sept. 7
France (Grand Prix) ..... Sept. 21

Caterpillar Licenses Bates

CHICAGO, June 16—The Caterpillar Tractor Co. has licensed the Bates Manufacturing Co., a subsidiary of the Foote Brothers Gear & Machine Co., to manufacture tractors under the Caterpillar patents. The licensing brings to a close the suit filed recently by the Caterpillar Tractor Co. to stop the alleged infringement of its patents.

To License Parachute Riggers

WASHINGTON, June 21—Effective July 1, 1930, any person who packs, repairs or is charged with the inspection and maintenance of parachutes approved as to airworthiness by the Department of Commerce will be required to obtain from the Department of Commerce a Parachute Rigger's license, under new regulations announced today by Clarence M. Young, assistant secretary of Commerce for aeronautics.

Delivers Aluminum Bodies

MILWAUKEE, June 16—Among the first motor trucks equipped with the new aluminum dump bodies manufactured by the Heil Co., Milwaukee, have just been delivered by the Sterling Motor Truck Co. to the Manegold-Stone Co., also of Milwaukee.

Northern Rubber Co. Gets Receiver; Action Friendly

Complete Reorganization Forecast By President

AKRON, June 17—W. P. Welker, trust officer of the Ohio State Bank & Trust Co., was named receiver Monday for the Northern Rubber Co., Barberton, by the Common Pleas Court. Mr. Welker's appointment follows a friendly action, and precedes a complete reorganization and an expansion program, according to President L. J. Schott.

The company's output is at present confined to tires. Its capacity is about 1000 tires per day. Mr. Schott has been the president since its organization seven years ago. Many Massillon people are interested in the concern.

Highway Marking Nears End

WASHINGTON, June 17—Reports received by the Bureau of Public Roads, U. S. Department of Agriculture, indicate that the work of erecting the standard markers for numbered routes in the United States System of Highways will be practically complete at the end of the construction period of 1930. The system was adopted less than five years ago by State Highway Departments, and comprises approximately 97,000 miles of the most important highways of the nation. Practically all of these routes are also in the Federal-aid highway system.

Navy Selling Aero Material

PHILADELPHIA, June 17—A sale of Navy surveyed and surplus material including aviation material, machine tools, rubber and metal scrap, and miscellaneous bolts, nuts, etc., as described in catalog No. 594, has been announced by the Supply Officer, Sales Division, Navy Yard, Philadelphia, Pa. Sealed bids and proposals will be opened July 10. A copy of the catalog and terms may be got from the supply officer.

Lakey Reports Profit

DETROIT, June 16—The Lakey Foundry & Machine Co., reports a net profit of $37,037 for the six months ended April 30, after all charges including Federal taxes. This is equal to 11.8 cents a share on 315,025 shares no par capital stock, and compares with net profit of $112,486 or 37 cents a share on 299,509 shares for the six months ended April 30, 1929.

Overland Expects Profit

CHICAGO, June 14—L. A. Miller, president of the Willys-Overland Co., estimates that the company will make a small net profit for the first six months of the year. He said about 9000 employees are working four days a week in the plant at Toledo.

Evans Passes Dividend

CHICAGO, June 16—The Evans Auto Loading Co. has omitted the quarterly dividend of 62½ cents a share.